

RECORDS OF THE AUSTRALIAN MUSEUM

Volume 66

Number 3

16 April 2014

DEEP-SEA SQUAT LOBSTERS
OF THE *MUNIDOPSIS SERRICORNIS* COMPLEX
IN THE INDO-WEST PACIFIC,
WITH DESCRIPTIONS OF SIX NEW SPECIES
(CRUSTACEA: DECAPODA: MUNIDOPSIDAE)

by

SHANE AHYONG

nature culture **discover**



Editorial Board

Dr Shane Ah Yong
Dr Don Colgan
Dr Elena Kupriyanova
Dr Andrew Mitchell
Dr Robin Torrence
Dr Ross Sadler

Editor

Dr Shane McEvey

Journal compilation © 2014 Australian Museum, Sydney

No part of this publication may be reproduced without permission of the Editor.

Volume 66 Number 3

Published (print and online) 16 April 2014

Price: AU\$30.00

Printed by Rodenprint Pty Ltd, Sydney

ISSN 0067-1975 (print)

ISSN 2201-4349 (online)

The Australian Museum is a statutory authority of,
and principally funded by, the NSW State Government.



The Australian Museum houses some of the world's most important collections of Australian animal, fossil and geological specimens and cultural objects. Research on these millions of specimens and artefacts yields insights into how our world changes through time and how its diversity can be classified, interpreted, and appreciated. This knowledge, when shared among the scientific and broader community—initially through publication—helps us understand human impact on our environment and what reasonable steps society can take now for the well-being of future generations. Our responsibility is to inspire the exploration of nature and cultures; our vision is a beautiful and sustainable natural world with vibrant and diverse cultures.

Since 1889 the results of studies on Australian Museum collections, or studies that more generally lead to a better understanding of nature and cultures in the Australian Region, have been published by the Museum in its premier science journal *Records of the Australian Museum*. In 1999 we began releasing PDF of published articles through our open archive website. In 2008 we adopted DOI registration for our online content to facilitate permanence. In 2009 we digitized the entire legacy of all science published by us since 1851, and made that huge searchable resource permanently and freely available at our website. To accelerate publication of peer-reviewed science we are adopting a one article per publication model from volume 65 and we are limiting, but not abandoning, print production. All that is published in print is immediately and freely available online.

Authors are invited to submit manuscripts to the Editor. Manuscripts meeting subject and stylistic requirements outlined in the *Instructions to Authors* are peer-reviewed by external referees to meet standards of excellence set by the Editorial Board.

<http://australianmuseum.net.au/Scientific-Publications>

Search publications at

<http://australianmuseum.net.au/journalfinder>

Records of the Australian Museum is covered in the Thomson Reuters Scientific services: Current Contents® / Agriculture, Biology, and Environmental Sciences, and Science Citation Index Expanded (also known as SciSearch®)

We encourage cross-linking in the scientific literature by applying DOI registration to Australian Museum publications via CrossRef®

Deep-sea Squat Lobsters of the *Munidopsis serricornis* Complex in the Indo-West Pacific, with Descriptions of Six New Species (Crustacea: Decapoda: Munidopsidae)

SHANE T. AHYONG

Australian Museum, 6 College Street, Sydney NSW 2010, Australia, and

School of Biological, Earth and Environmental Sciences,
University of New South Wales, Kensington, NSW 2052, Australia

ABSTRACT. The deep-sea squat lobster, *Munidopsis serricornis* (Lovén, 1852), originally described from the north-eastern Atlantic, has long been considered near cosmopolitan with numerous reports also from the western Pacific and northern Indian Ocean. These Indo-West Pacific records are reviewed along with new material from seamounts throughout the region. *Munidopsis serricornis* sensu stricto is restricted to the Atlantic Ocean. Six new species are described from the Indo-West Pacific: *M. alcocki* sp. nov. from the central to western Indian Ocean; *M. atlantis* sp. nov., from the Southwest Indian Ridge; *M. macphersoni* sp. nov. from the Austral Islands, French Polynesia; *M. spiridonovi* sp. nov. from the western Indian Ocean; *M. nias* sp. nov. from southern Indonesia and the Nicobar Islands; and *M. pyrochela* sp. nov. from New Zealand, Australia and the Southwest Indian Ridge.

KEYWORDS: Anomura, taxonomy, Subantarctic, Pacific Ocean, Indian Ocean, seamounts.

AHYONG, SHANE T. 2014. Deep-sea squat lobsters of the *Munidopsis serricornis* complex in the Indo-West Pacific, with descriptions of six new species (Crustacea: Decapoda: Munidopsidae). *Records of the Australian Museum* 66(3): 197–216.

More than 250 species of the squat lobster genus *Munidopsis* Whiteaves, 1874, are known worldwide (Baba *et al.*, 2008; Ah Yong *et al.*, 2011). Most species are regionally restricted, occurring either in the Indo-West Pacific or Atlanto-East Pacific, but seldom in both regions. Among the few *Munidopsis* species currently believed cosmopolitan or near cosmopolitan, *M. serricornis* (Lovén, 1852) has been reported from the eastern and western Atlantic Ocean, Indian Ocean, south-western Pacific Ocean and South China Sea (Baba *et al.*, 2008). Morphological heterogeneity between Atlantic, Pacific and Indian Ocean populations, however, suggests that published records of *M. serricornis* are based on several species (e.g., Baba, 1988; Baba & Poore, 2002; Ah Yong & Poore, 2004; Macpherson, 2007; Osawa *et al.*, 2008).

The name *Munidopsis serricornis*, and its synonyms, *M. rosacea* (A. Milne-Edwards, 1881) and *M. tridentata* (Esmark, 1857), has been widely applied to forms sharing the combination of a broad, flat, distally trifid rostrum, unarmed eyestalks, distinct outer orbital spines, pereopods without epipods, unarmed abdominal tergites and an unarmed dorsal carapace surface (apart from sometimes a pair of epigastric spines). Some records of *M. serricornis* from Australia and New Zealand have already been identified as other species, such as *M. treis* Ah Yong & Poore, 2004 (type locality: Great Australian Bight) and *M. comarge* Taylor, Ah Yong & Andreakis, 2010 (type locality: off Albany, Western Australia). Additionally, new *serricornis*-complex species continue to be discovered, such as, *M. pubescens*

Macpherson, 2007 (type locality: Madagascar), and *M. ternaria* Macpherson, 2007 (type locality: New Caledonia). *Munidopsis serricornis* sensu stricto, together with other close relatives worldwide, form the *serricornis* complex. As part of a review of the *serricornis* complex, the present study analyses new seamount material from Indo-West Pacific localities and reassesses previous records of *M. serricornis* from the region. *Munidopsis serricornis* sensu stricto is restricted to the Atlantic Ocean and six new *serricornis*-complex species from the Indo-West Pacific are described.

Materials and methods

Morphological terminology generally follows Baba *et al.* (2009) and Baba *et al.* (2011). Carapace length (cl) is measured along the dorsal midline and includes the rostrum. Postorbital carapace length (pcl) is measured from the posterior margin of the orbit to the midposterior margin of the carapace. Specimens examined are deposited in the collections of the Australian Museum, Sydney (AM); Muséum national d'Histoire naturelle, Paris (MNHN); Museum Victoria, Melbourne (NMV); Zoological Museum, Moscow State University, Moscow (ZMM); National Institute of Water and Atmospheric Research, Wellington (NIWA); Oxford University Museum of Natural History (OUMNH); National Museum of Natural History, Smithsonian Institution, Washington D.C. (USNM); the Zoologische Museum Berlin (ZMB); and the Zoological Museum, University of Copenhagen, Denmark (ZMUC). The distribution map was produced with the aid of PanMap version 0.9.6 (www.pangaea.de/software/PanMap/).

Systematics

Munidopsidae Ortmann, 1898

Munidopsis Whiteaves, 1874

Munidopsis alcocki sp. nov.

Figs 1, 9

- Munidopsis ?rosacea*.—Alcock & Anderson, 1899a: 4, 19.
Munidopsis rosacea.—Alcock & Anderson, 1899b: pl. 40: fig. 4 [Not *M. rosacea* (A. Milne-Edwards, 1881) = *M. serricornis* (Lovén, 1852)].
Munidopsis (Galathodes) ?tridentata.—Alcock, 1901: 264–265. [Not *M. tridentata* Esmark, 1857].
Munidopsis serricornis.—Ahyong & Poore, 2004: 57 [Bay of Bengal specimens only]; Macpherson, 2007: 97.

Type material. HOLOTYPE: AM P2701 (ex Indian Museum 783/10), male (cl 13.6 mm, pcl 10.1 mm), Bay of Bengal, off Ceylon [Sri Lanka], 8°44'40"N 81°20'15"E, 296–320 fathoms [542–586 m], green mud, RIMSS *Investigator* Stn 201, 16 April 1895. PARATYPES: AM P87579 (ex Indian Museum 783/10), 1 female (cl 12.2 mm, pcl 9.0 mm), collected with holotype; ZMUC CRU10114, 1 male (cl 13.9 mm, pcl 10.3 mm), 1 ovigerous female (cl 14.2 mm, pcl 11.1 mm), Laccadive Sea, southwest of Wadge Bank, off the Travancore coast, 7°17'30"N 76°54'30"E, 430 fathoms [787 m], bottom temp 3.3°C, RIMSS *Investigator* Stn 232, 19 October 1897.

Other material examined.—**Madagascar:** MNHN IU-2011-5082 (Ga1426), 1 male (cl 12.2 mm, pcl 8.8 mm), 1 ovigerous female (cl 9.6 mm, pcl 7.0 mm), 22°18.9'S 43°01.1'E, 735–760 m, Chalutage 108, coll. A. Crosnier, 30 November 1973.

Diagnosis. Rostrum broad, flat, medially carinate, trifid distally. Carapace unarmed dorsally; surface of dorsal half smooth or with faint short striae; lateral margins with 4 spines (1 anterolateral, 3 branchial); posterior orbital margin transverse; outer orbital spine distinct. Abdominal tergites unarmed. Telson with 8 plates. Maxilliped 3 merus flexor margin with 2 or 3 spines. Cheliped carpus length less than twice width, dorsal surface unarmed; merus with 2 longitudinal rows of prominent spines (mesial, ventromesial). Walking leg meri unarmed or minutely spinose along extensor margin; dactylus flexor margin with movable spines, and more slender movable spine at base of corneous unguis. Pereopods without epipods.

Description. *Carapace:* Moderately convex from side to side; sparsely covered with short, fine setae; surface of anterior half smooth, with few scattered, fine short striae; surface of posterior half with fine distinct striae. Cervical groove indistinct. Epigastric spines absent. Posterior orbital margins transverse to slightly oblique, outer orbital spine prominent. Frontal margins oblique; anterolateral spine similar to outer orbital spine. Lateral margins broadly convex; with 2 spines on anterior branchial margin and spine at junction of anterior and posterior branchial margins. Rostrum broad, 0.3–0.4 pcl; trifid distally; apex slightly deflected dorsally; median carina distinct; lateral proximal margin convex. Posterior margin unarmed. Pterygostomial flap with short diagonal striae; anterior margin blunt, angular.

Sternum: Sternite 3 about 0.3 width of sternite 4. Posterior margin of sternite 3 contiguous with anterior margin of sternite 4. Sternites smooth, sparsely setose, unarmed.

Abdomen: Tergites with short, fine, scattered setae, unarmed. Tergites 2–4 with elevated anterior ridge; tergites 2 and 3 also with shallow groove behind anterior ridge. Tergites 4 and 5 with shallow, medially interrupted, transverse groove. Tergite 6 smooth; posterior margin not strongly produced. Telson composed of 8 plates (minute central plate present); lateral margin of midlateral plate lined with coarse, relatively stiff setae in males, distally setose in females. Uropodal endopod lateral margins setose, unarmed.

Eye: Ocular peduncle unarmed, sparsely setose; movable; partially concealed by rostrum. Cornea subglobular, slightly wider than peduncle. Small, slender spine adjacent to lateral margin of eye.

Antennule: Basal article squat, with 2 distolateral spines, dorsal spine shorter; distomesial margin with short triangular tooth.

Antenna: Basal article with triangular mesial and lateral tooth, neither overreaching article 2. Article 2 with strong distolateral spine, reaching beyond midlength but not apex of article 3. Article 3 with short distomesial spine. Article 4 with lateral triangular projection. Flagellum as long as cl.

Maxilliped 3: Dactylus, propodus and carpus unarmed. Merus extensor margin with small distal spine, dorsal margin smooth, unarmed; flexor margin with 2 large triangular spines proximally and usually 1 minute spine distally (absent on left side of holotype). Ischium longer than wide, with distal flexor and extensor spine. Crista dentata with 25–28 denticles.

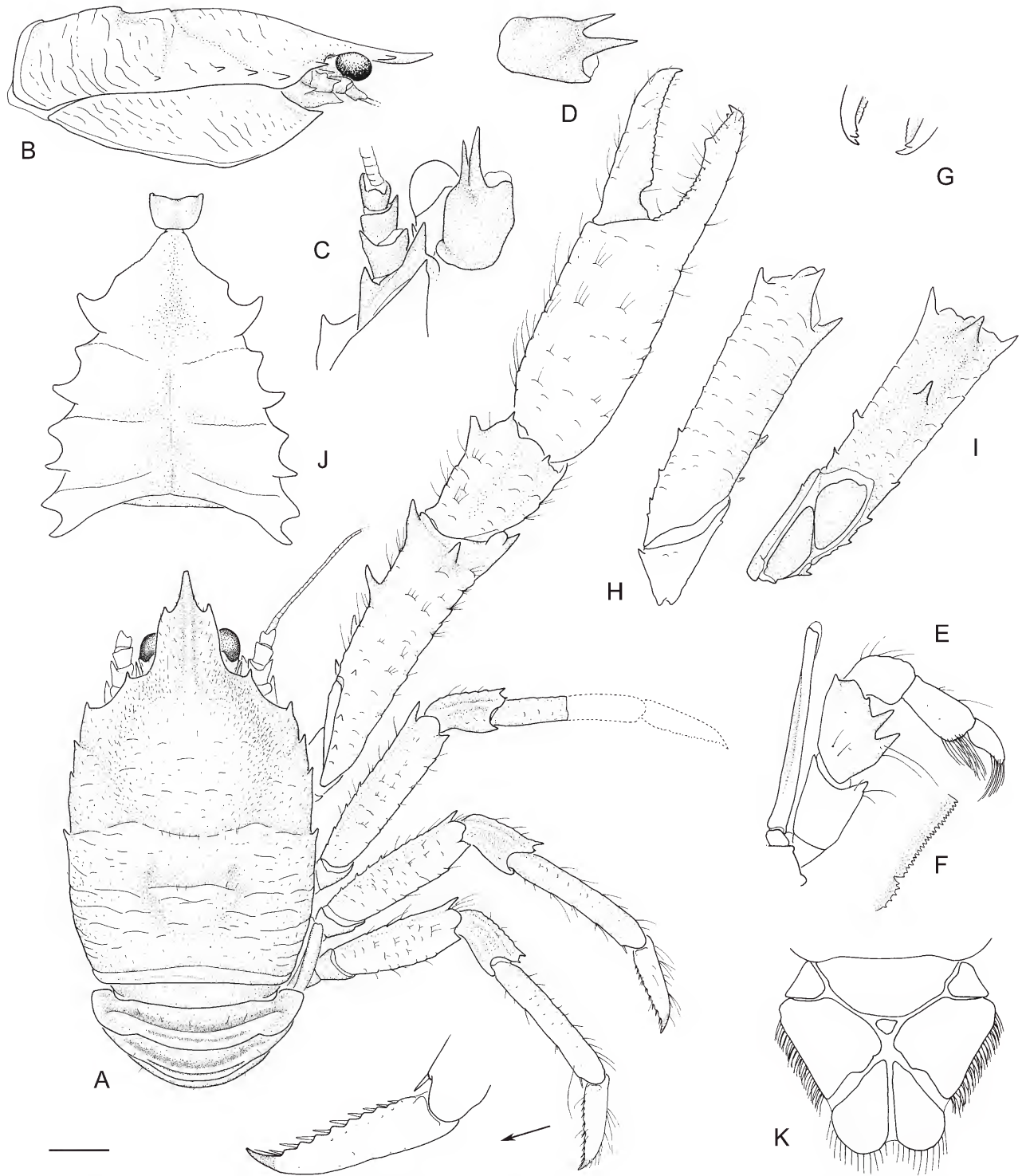


Figure 1. *Munidopsis alcocki* sp. nov., male holotype, cl 13.6 mm, pcl 10.1 mm (AM P2701). (A) dorsal habitus; (B) carapace, right lateral view; (C) right antenna and antennule, ventral view; (D) right basal antennular article, lateral view; (E) right maxilliped 3; (F) right crista dentata; (G) right cheliped finger tips, ventral view; (H) right cheliped ischiomerus, lateral view; (I) right ischiomerus, mesial view; (J) sternal plastron; (K) telson. Scale: A, B, G–I = 2.0 mm; C–F, J, K = 1.0 mm.

Pereopod 1 (cheliped): Cheliped elongate, 2.3–2.9 pcl (males), 2.3–2.5 (females); with sparsely distributed, simple golden setae, most numerous on dorsal and ventral margins; subcylindrical to ovate. Ischium with dorsal spine; small ventrodiscal spine (reduced to low tubercle in holotype). Merus with row of 3–5 small dorsal spines on proximal half to two-

thirds; mesial margin with 2 large mesial spines, one distally at carpal articulation, one slightly distal to midlength of margin; ventromesial margin with 1–3 (usually 2) strong spines proximally and distal spine. Carpus stout, about 1.4–1.7 times longer than wide; dorsal margin with distal and subdistal spine, latter largest; small laterodistal spine. Propodus unarmed,

palm 1.9–2.2 times as long as wide; mesial margin of palm as long as or longer than dactylus. Pollex and dactylus occlusal margins crenulated, apices with interlocking teeth; pollex occlusal margin with low tooth distal to midlength in male holotype, without gape in female paratype; dactylus occlusal margin with low proximal tooth. Epipod absent.

Pereopods 2–4: Slightly compressed; decreasing in length posteriorly; with scattered, setose striae. Merus elongate; length about 4 times width (pereopod 2) to about 3 times width (pereopod 4); extensor margin or with 3–7 small spines (pereopods 2 and 3) or unarmed (pereopod 4); distal extensor margin with large distal spine; flexor margin irregular but not spinose except for angular distal spine. Carpus with distal extensor spine and small acute tubercle near propodal articulation; extensor margin irregular or serrated (but not spinular); with low, irregular, dorsal carina. Propodus extensor margin irregular, unarmed; flexor margin with movable spine at distal one-third and paired movable spines distally adjacent to dactylar articulation. Dactylus about two-thirds propodus length; extensor margin unarmed, with scattered setae; flexor margin with 9 or 10 short triangular teeth, each bearing corneous movable spine and more slender movable spine at base of corneous unguis. Epipods absent.

Egg diameter: 1.2–1.5 mm.

Colour in life. Unknown.

Etymology. Named in honour of Alfred William Alcock (1859–1933) for his major contributions to eastern Indian Ocean deep-sea zoology, especially carcinology.

Remarks. Previous records of *M. serricornis* (also as *M. tridentata* and *M. ?rosacea*) from the northern Indian Ocean (Alcock & Anderson, 1899a, b; Alcock, 1901) and Madagascar (Macpherson, 2007) are referable to *M. alcocki* sp. nov. In addition to the RIMSS *Investigator* specimens examined here from the Bay of Bengal, Alcock (1899, 1901a) recorded material from the following *Investigator* station: Stn 218, off North Maldivé Atoll, 6°55'06"N 72°55'E, 210 fathoms [384 m], bottom temperature 11.1°C, 21 October 1896.

Northern specimens of *M. alcocki* agree well with those from Madagascar. Sexual dimorphism in cheliped length is evident in all but the two smallest specimens (male pcl 7.0 mm, female pcl 8.8 mm, MNHN IU-2011-5082), which have similar proportional cheliped lengths (2.3 pcl). Above this size, proportional male and female cheliped lengths differ (males 2.8–2.9 pcl; females 2.4–2.5 pcl). The two ovigerous females carried two (MNHN IU-2011-5082) and eight eggs (ZMUC CR10114), respectively.

As with *M. serricornis* in the Atlantic Ocean, *M. alcocki* may be associated with deepwater corals, having been collected together with *Caryophyllia paradoxus* Alcock, *Javania cailleti* (Duchassaing & Michelotti) (as *Desmophyllum vitreum* Alcock), *Madrepora oculata* Linnaeus (as *Lophohelia investigatoris* Alcock), and *Solenosmilia variabilis* Duncan (as *S. jeffreyi* Alcock) (see Alcock & Anderson, 1899a).

Munidopsis alcocki is most similar to *M. serricornis* from the Western Atlantic and *M. modesta* Benedict, 1902 from the eastern Pacific in lacking epigastric spines but is readily distinguished by its minutely rather than strongly spinose extensor margins on the meri of the walking legs.

Distribution. Indian Ocean from Madagascar to the Laccadive Sea, Maldives and Bay of Bengal; 384–787 m.

Munidopsis atlantis sp. nov.

Figs 2, 9

Type material. HOLOTYPE: OUMNH.ZC.2013-01-007, ovigerous female (cl 9.8 mm, pcl 6.8 mm), Atlantis Bank, Southwest Indian Ridge, 32°42.862'S 57°14.666'E, 1117 m, RRS *James Cook* cruise JC066, ROV *Keel 6000*, 10 December 2011.

Diagnosis. Rostrum broad, flat, medially carinate, trifid distally. Carapace with pair of epigastric spines, otherwise unarmed dorsally; surface of dorsal half with granules and short rugae; lateral margins with 4 spines (1 anterolateral, 3 branchial); posterior orbital margin transverse; outer orbital spine distinct. Abdominal tergites unarmed. Telson with 8 plates. Maxilliped 3 merus flexor margin with 2 spines. Cheliped carpus length twice width, dorsal surface unarmed. Walking leg meri irregular to serrated along extensor margin; dactylus flexor margin with movable spines, and more slender movable spine at base of corneous unguis. Pereopods without epipods.

Description. *Carapace*: Moderately convex from side to side; surface with few scattered short setae, almost glabrous; surface of anterior half with granules and small rugae or short striae; surface of posterior half with short striae. Cervical groove indistinct. Pair of epigastric spines flanked by short scales. Posterior orbital margins transverse, outer orbital spine prominent. Frontal margins oblique, concave; anterolateral spine similar to outer orbital spine. Lateral margins subparallel; with 2 spines on anterior branchial margin and blunt spine at junction of anterior and posterior branchial margins. Rostrum broad, 0.4 pcl; trifid distally; apex horizontal; median carina distinct; lateral proximal margin weakly convex, tapering. Posterior margin unarmed, shallowly concave medially. Pterygostomian flap with short diagonal striae posteriorly and short rugae anteriorly; anterior margin blunt, angular.

Sternum: Sternite 3 about 0.3 width of sternite 4. Posterior margin of sternite 3 contiguous with anterior margin of sternite 4. Sternites smooth, sparsely setose, unarmed.

Abdomen: Tergites unarmed; surface with few scattered setae, almost glabrous. Tergites 2–4 with elevated anterior ridge; tergites 2 and 3 also with shallow groove behind anterior ridge. Tergites 4–6 smooth; posterior margin not strongly produced. Telson composed of 8 plates (minute central plate present). Uropodal endopod lateral margins setose, unarmed.

Eye: Ocular peduncle unarmed, glabrous; movable; partially concealed by rostrum. Cornea subglobular, slightly wider than peduncle. Small, slender spine adjacent to lateral margin of eye.

Antennule: Basal article squat, with 2 distolateral spines, dorsal shorter; distomesial margin with short triangular tooth.

Antenna: Basal article with triangular mesial and lateral tooth, neither overreaching article 2. Article 2 with strong distolateral spine, reaching midlength of article 3. Articles 3 and 4 unarmed. Flagellum 1.2 pcl.

Maxilliped 3: Dactylus, propodus and carpus unarmed. Merus extensor margin with distal spine; flexor margin with 2 large triangular spines proximally and 2 low tubercles distally. Ischium longer than wide, with acute distal flexor and extensor angles. Crista dentata with 26–30 denticles.

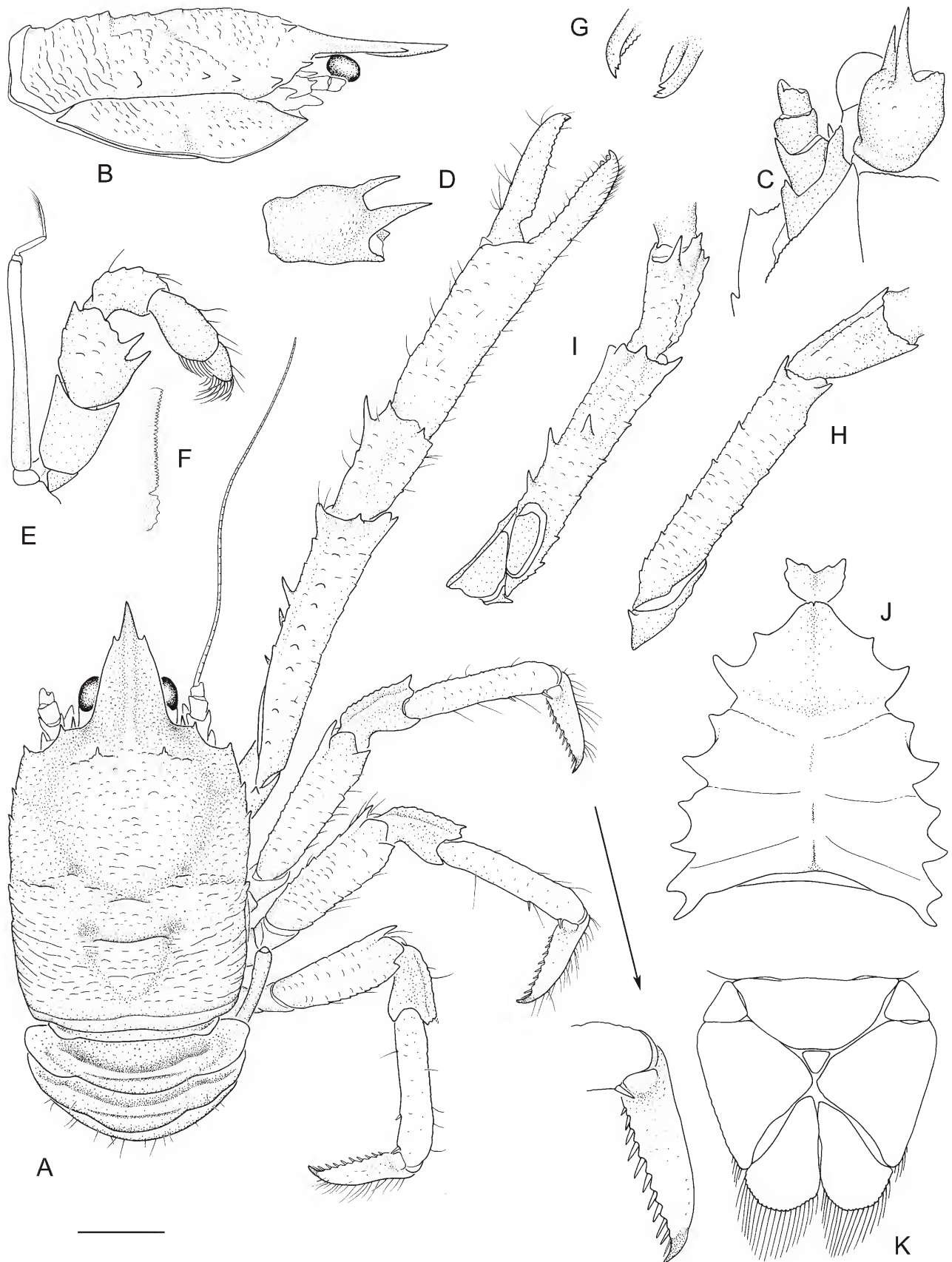


Figure 2. *Munidopsis atlantis* sp. nov., ovigerous female holotype, cl 9.8 mm, pcl 6.8 mm (OUMNH.ZC.2013-01-007). (A) dorsal habitus; (B) carapace, right lateral view; (C) right antenna and antennule, ventral view; (D) right basal antennular article, lateral view; (E) right maxilliped 3; (F) right crista dentata; (G) right cheliped finger tips, ventral view; (H) right cheliped ischiomerus, lateral view; (I) right ischiomerus, mesial view; (J) sternal plastron; (K) telson. Scale: A, B, G–I = 2.0 mm; C–F, J, K = 1.0 mm.

Pereopod 1 (cheliped): Cheliped elongate, 2.7 pcl, sparse simple golden setae, most numerous on dorsal and ventral margins; subcylindrical to ovate. Ischium with dorsal spine; without ventral spine. Merus with row of 4 or 5 small, graded, well-spaced dorsal spines and large distal dorsal spine; mesial margin with 2 large spines, one distally at carpal articulation, one at distal one-third of margin; ventromesial margin with 2 strong proximal spines and distal spine. Carpus length about 2 times width; mesial margin with distal and subdistal spine, latter largest; small dorsodistal and ventrodistal spine. Propodus unarmed, palm about 2.7 times as long as wide; mesial margin of palm longer than dactylus. Pollex and dactylus occlusal margins crenulated, apices with interlocking teeth, small proximal gape on dactylus. Epipod absent.

Pereopods 2–4: Slightly compressed; decreasing in length posteriorly; with scattered, setose striae. Merus elongate; length 3.4 times width (pereopod 2) to 2.8 (pereopod 4); extensor margin irregular to serrated but not spinose; distal extensor margin with large distal spine; flexor margin irregular but not spinose except for triangular distal spine. Carpus with distal extensor spine and irregular to serrated margin; low, irregular, dorsal carina. Propodus extensor margin irregular, unarmed; flexor margin with movable spine at distal one-third and paired movable spines distally adjacent to dactylar articulation. Dactylus about two-thirds propodus length; extensor margin with scattered setae, unarmed; flexor margin with 9 or 10 low triangular teeth, each bearing corneous movable spine and more slender movable spine at base of corneous unguis. Epipods absent.

Egg diameter: 1.5 mm.

Colour in life. Unknown.

Etymology. From the type locality, Atlantis Bank; used as a noun in apposition.

Remarks. *Munidopsis atlantis* sp. nov. is most similar to *M. comarge* and *M. ternaria* in the combination of a granulated and rugose anterior half of the carapace and serrated but not spinose extensor meral margins of the walking legs. It resembles *M. ternaria* (and differs from *M. comarge*) in having epigastric spines and differs from both species in having lateral carapace spines behind the anterolateral spine. *Munidopsis atlantis* and *M. macphersoni* differ in the number of lateral spines on the carapace behind the anterolateral spine, three in the latter, four in the former. *Munidopsis atlantis* is also superficially similar to *M. crinita* Faxon, 1893, from the eastern Pacific in sharing the presence of epigastric spines and unarmed extensor margins of the meri of the walking legs, but is readily distinguished by the glabrous or sparsely setose, rather than, densely setose body and chelipeds.

Macpherson *et al.* (2014) recently described *Munidopsis mandelai* from Atlantis Bank and Middle of What Seamount at 703–1135 m depth; it is readily distinguished from *M. atlantis* in the absence of lateral rostral spines and presence of eyespines.

Distribution. Presently known only from Atlantis Bank, Southwest Indian Ridge; 1117 m.

Munidopsis macphersoni sp. nov.

Figs 3, 9

Type material. HOLOTYPE: MNHN IU-2010-1429, female (cl 7.8 mm, pcl 5.2 mm), MacDonald Bank, Austral Islands, French Polynesia, 29°00'S 140°14.9'W, 488–700 m, BENTHAUS DW1874, RV *Alis*, 4 November 2002.

Diagnosis. Rostrum broad, flat, medially carinate, trifid distally. Carapace with pair of epigastric spines, otherwise unarmed dorsally; surface of dorsal half with granules and short rugae; lateral margins with 5 spines (1 anterolateral, 4 branchial); posterior orbital margin transverse; outer orbital spine distinct. Abdominal tergites unarmed. Telson with 8 plates. Maxilliped 3 merus flexor margin with 2 or more spines. Cheliped carpus length less than twice width, dorsal surface unarmed. Walking leg meri spinose along extensor margin; dactylus flexor margin with movable spines and more slender movable spine at base of corneous unguis. Pereopods without epipods.

Description. *Carapace*: Moderately convex from side to side; surface with few scattered short setae, almost glabrous; surface of anterior half with granules and small rugae or short striae; surface of posterior half with short striae. Cervical groove indistinct. Pair of epigastric spines. Posterior orbital margins transverse, outer orbital spine prominent. Frontal margins oblique, slightly concave; anterolateral spine similar to outer orbital spine. Lateral margins broadly convex; with 3 blunt spines on anterior branchial margin and spine at junction of anterior and posterior branchial margins. Rostrum broad, slightly less than 0.5 pcl; trifid distally; apex slightly deflected dorsally; median carina distinct; lateral proximal margin convex. Posterior margin unarmed. Pterygostomial flap with short diagonal striae; anterior margin blunt, angular.

Sternum: Sternite 3 about one-third width of sternite 4. Posterior margin of sternite 3 contiguous with anterior margin of sternite 4. Sternites smooth, sparsely setose, unarmed.

Abdomen: Tergites unarmed; surface with few scattered short setae, almost glabrous. Tergites 2–4 with elevated anterior ridge; tergites 2 and 3 also with shallow groove behind anterior ridge. Tergites 4 and 5 with shallow, medially interrupted, transverse groove. Tergite 6 smooth; posterior margin not strongly produced. Telson composed of 8 plates (minute central plate present). Uropodal endopod lateral margins setose, unarmed.

Eye: Ocular peduncle unarmed, glabrous; movable; partially concealed by rostrum. Cornea subglobular, slightly wider than peduncle. Small, slender spine adjacent to lateral margin of eye.

Antennule: Basal article squat, with 2 subequal distolateral spines; distomesial margin with short rounded tooth.

Antenna: Basal article with triangular mesial and lateral tooth, neither overreaching article 2. Article 2 with strong distolateral spine, reaching midlength of article 3. Articles 3 and 4 unarmed. Flagellum slightly longer than pcl.

Maxilliped 3: Dactylus, propodus and carpus unarmed. Merus extensor margin with distal spine; flexor margin with 2 large triangular spines proximally and 2 smaller spines

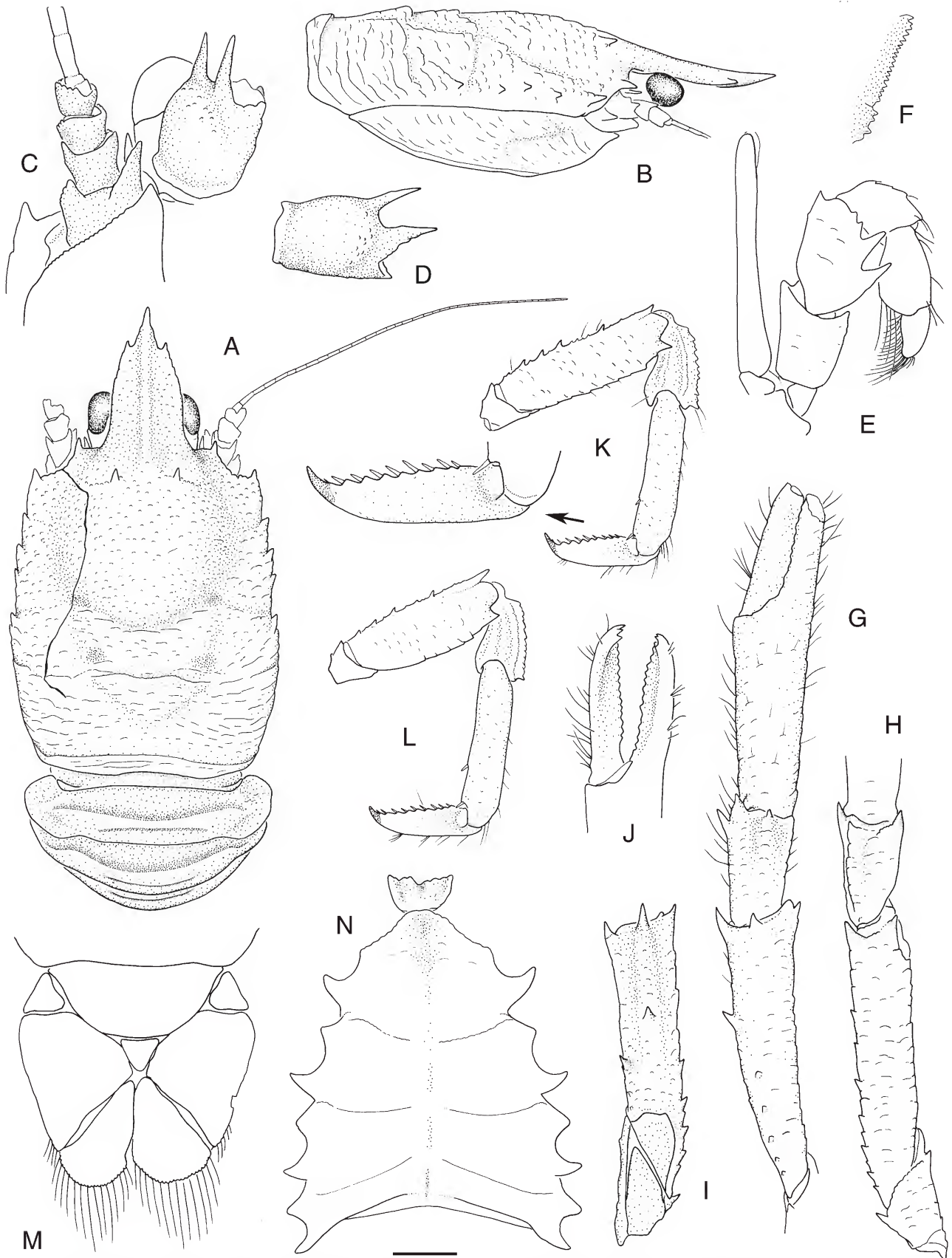


Figure 3. *Munidopsis macphersoni* sp. nov., female holotype, cl 7.8 mm, pcl 5.2 mm, (MNHN IU-2010-1429). (A) cephalothorax and abdomen, dorsal; (B) carapace, right lateral view; (C) right antenna and antennule, ventral view; (D) right basal antennular article, lateral view; (E) right maxilliped 3; (F) right crista dentata; (G) right cheliped dorsal view; (H) right cheliped carpus and ischiomerus, lateral view; (I) right ischiomerus, mesial view; (J) left cheliped fingers, ventral view; (K) right pereopod 2, dorsal view; (L) right pereopod 3, dorsal view; (M) telson; (N) sternal plastron. Scale: A, B, G–L = 1.0 mm; C–F, M, N = 0.5 mm.

distally. Ischium longer than wide, with acute distal flexor and extensor angles. Crista dentata with 17 or 18 denticles.

Pereopod 1 (cheliped): Cheliped elongate, 2.7 pcl, simple golden setae, most numerous on dorsal and ventral margins; subcylindrical to ovate. Ischium with dorsal spine; without ventral spine. Merus with row of 5 or 6 small, graded dorsal spines along proximal half and large distal dorsal spine; mesial margin with 2 large spines, one distally at carpal articulation, one at distal one-third of margin; ventromesial margin with small proximal spine and strong distal spine. Carpus about 1.8 times longer than wide; mesial margin with distal and subdistal spine, latter largest; small dorsodistal and ventrodistal spine. Propodus unarmed, palm about 2.5 times as long as wide; mesial margin of palm longer than dactylus. Pollex and dactylus occlusal margins crenulated, apices with interlocking teeth. Epipod absent.

Pereopod 2–3 (pereopod 4 unknown): Slightly compressed; decreasing in length posteriorly; with scattered, setose striae. Merus elongate; length about 3.4 times width (pereopod 2); extensor margin with short upright spines; distal extensor margin with large distal spine; flexor margin irregular but not spinose except for strong distal spine. Carpus with distal extensor spine and serrated margin; with low, irregular, dorsal carina. Propodus extensor margin straight, unarmed; flexor margin with movable spine at distal one-third and paired movable spines distally adjacent to dactylar articulation. Dactylus about two-thirds propodus length; extensor margin with scattered setae, unarmed; flexor margin with 8 low triangular teeth, each bearing corneous movable spine and more slender movable spine at base of corneous unguis. Epipods absent.

Colour in life. Unknown.

Etymology. Named for Enrique Macpherson, for his major contributions to galatheid systematics.

Remarks. *Munidopsis macphersoni* sp. nov., together with the eastern Pacific *M. crinita* Faxon, 1893, differ from other *serricornis*-complex species in having four instead of three branchial or no marginal spines on the carapace behind the anterolateral spine. *Munidopsis macphersoni* is readily distinguished from *M. crinita* in having an almost glabrous body and sparsely setose chelipeds. In *M. crinita*, the carapace and chelipeds are densely setose. Of other *serricornis*-complex species, *M. macphersoni* resembles, *M. ternaria*, *M. comarge* and *M. atlantis* sp. nov. in the granular rather than smooth or weakly striate dorsal surface of the anterior half of the carapace. The new species agrees with *M. atlantis* sp. nov., and differs from *M. ternaria* and *M. comarge* in having distinct (albeit blunt) teeth along the branchial margins; these margins are unarmed in the latter two species. From *M. atlantis*, *M. macphersoni* differs in having three instead of four marginal branchial spines on the carapace.

Distribution. Presently known only from the Austral Islands, French Polynesia; 488–700 m.

Munidopsis nias sp. nov.

Figs 4, 5, 9

Munidopsis (Galathodes) tridentata.—Doflein & Balss, 1913: 158 [Indonesian specimens only].

Munidopsis serricornis.—Baba & Poore, 2002: fig. 6D, 7C, 8C, 9E.

Type material. HOLOTYPE: ZMB 17506, male (cl 13.4 mm, pcl 10.0 mm), off SE Nias, Indonesia, 0°27'N 98°07'E, 646 m, Deutsche Tiefsee Expedition, stn 196, 1 February 1899. PARATYPES: ZMB 17505, 2 ovigerous females (cl 11.9+ mm, pcl 9.4 mm; cl 11.6 mm, pcl 8.6 mm), 1 juvenile female (cl 6.0 mm, pcl 4.0 mm), collected with holotype.

Diagnosis. Rostrum broad, subquadrate, flat, medially carinate, trifid distally. Carapace unarmed dorsally; surface of dorsal half smooth; lateral margins with 4 spines (1 anterolateral, 3 branchial); posterior orbital margin transverse; outer orbital spine distinct. Abdominal tergites unarmed. Telson with 7 plates. Maxilliped 3 merus flexor margin with 1 spine. Cheliped merus with 3 longitudinal rows of prominent spines (dorsal, mesial, ventromesial). Walking leg meri and carpi distinctly spinose along extensor margin; pereopod 2 merus stout, length 2.5 times width; dactylus flexor margin with movable spines, distalmost remote from corneous unguis. Pereopods without epipods.

Description of adults. *Carapace*: Moderately convex from side to side; finely setose; surface of anterior half smooth, at most with very fine, short striae; surface of posterior half with fine striae. Cervical groove indistinct. Epigastric spines absent, at most a transverse row of short rugae. Posterior orbital margins transverse to slightly oblique, outer orbital spine prominent. Frontal margins oblique, slightly concave; anterolateral spine similar to outer orbital spine. Lateral margins broadly convex; carapace widest in posterior half; with 2 spines on anterior branchial margin and spine at junction of anterior and posterior branchial margins. Rostrum broad, subquadrate, 0.3–0.4 pcl; trifid distally; apex horizontal; median carina weakly indicated; lateral proximal margin straight or weakly convex. Posterior margin unarmed. Pterygostomial flap with short diagonal striae; anterior margin angular.

Sternum: Sternite 3 about one-third width of sternite 4. Posterior margin of sternite 3 broadly contiguous with anterior margin of sternite 4. Sternites smooth, sparsely setose, unarmed.

Abdomen: Tergites unarmed; surface with few scattered short setae, almost glabrous. Tergites 2–4 with elevated anterior ridge; tergites 2 and 3 also with shallow groove behind anterior ridge. Tergites 4–6 smooth; posterior margin not produced. Telson composed of 7 plates (minute central plate absent); lateral margin of midlateral plate lined with coarse, relatively stiff setae in males, non-setose in females. Uropodal endopod lateral margins setose, unarmed.

Eye: Ocular peduncle sparsely setose; movable; partially concealed by rostrum. Cornea subglobular, slightly wider than peduncle. Slender spine adjacent to lateral margin of eye.

Antennule: Basal article squat, with 2 distolateral spines, dorsal shorter; distomesial margin with short triangular tooth.

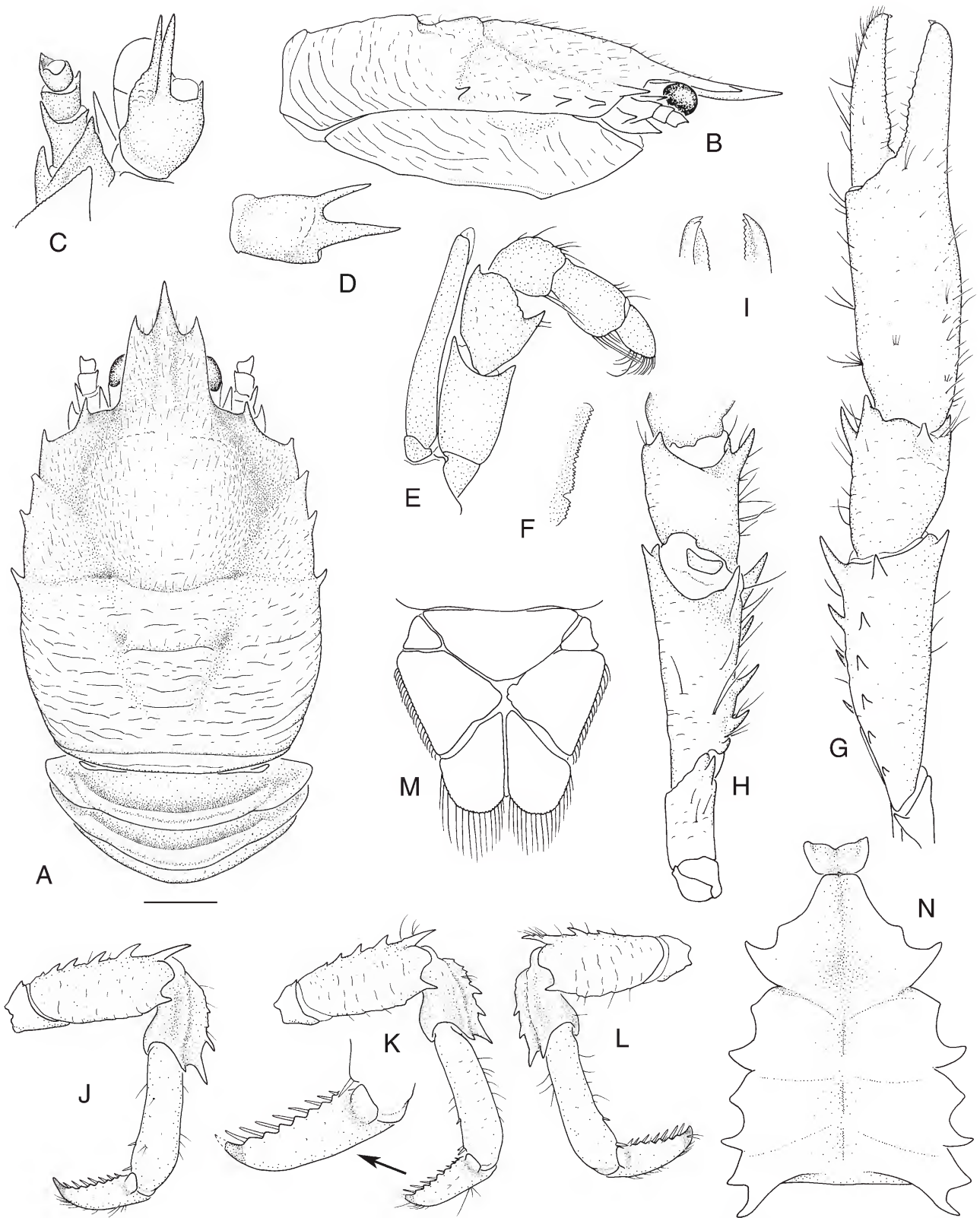


Figure 4. *Munidopsis nias* sp. nov., male holotype, cl 13.4 mm, pcl 10.0 mm (ZMB 17506). (A) cephalothorax and abdomen, dorsal; (B) carapace, right lateral view; (C) right antenna and antennule, ventral view; (D) right basal antennular article, lateral view; (E) right maxilliped 3; (F) right crista dentata; (G) right cheliped dorsal view; (H) right cheliped carpus and ischiomerus, ventral view; (I) right cheliped finger tips, ventral view; (J) right pereopod 2, dorsal view; (K) right pereopod 3, dorsal view; (L) left pereopod 4, dorsal view; (M) telson; (N) sternal plastron. Scale: A, B, G–L = 2.0 mm; C–F, M, N = 1.0 mm.



Figure 5. *Munidopsis nias* sp. nov., female paratypes (ZMB 17506), right cheliped. (A) pcl 4.0 mm; (B) pcl 9.4 mm. Scale = 1.0 mm.

Antenna: Basal article with triangular mesial and lateral tooth, neither overreaching article 2. Article 2 with strong distolateral and distomesial spine, former reaching beyond midlength of article 3. Article 3 with mesial spine. Article 4 with triangular lateral projection. Flagellum about as long as pcl.

Maxilliped 3: Dactylus, propodus and carpus unarmed. Merus extensor margin with distal spine; flexor margin with 1 large, sharp, triangular spine. Ischium longer than wide, with acute distal flexor and extensor angles. Crista dentata with 22 or 23 denticles.

Pereopod 1 (cheliped): Elongate, 2.3 pcl in both sexes, simple golden setae, most numerous on dorsal and ventral margins; subcylindrical to ovate. Ischium with ventrodistal spine and dorsal spine. Merus with longitudinal row of 4–6 graded dorsal spines and large distal dorsal spine; mesial margin with 1 or 2 large spines, one distally at carpal articulation, one at distal one-fourth of margin (absent in female paratypes); ventromesial margin with proximal row of 3 proximal spines (first spine smallest) and strong distal spine. Carpus 1.2–1.5 times longer than wide; mesial margin with distal and subdistal spine, latter largest; dorsodistal and ventrodistal spine; occasionally with small lateral distal spine. Propodus unarmed, palm about twice as long as wide; mesial margin of palm longer than dactylus. Pollex and dactylus occlusal margins crenulated, apices with interlocking teeth. Epipod absent.

Pereopods 2–4: Slightly compressed; decreasing in length posteriorly; with scattered, setose striae. Merus stout; length about 2.4 times width (pereopod 2) to 2.0 (pereopod 4); extensor margin with 4 or 5 (pereopods 2 and 3) and 2 or 3 (pereopod 4) slender, obliquely directed spines and slender distal spine; flexor margin irregular, with distal spine. Carpus with distal extensor spine and row of 2 or 3 slender spines and several minute spines or serrations; with low, irregular, dorsal carina terminating in spine. Propodus extensor unarmed; flexor margin with movable spine at distal one-fourth and paired movable spines distally adjacent to dactylar articulation. Dactylus about two-thirds propodus length; extensor margin with scattered setae, unarmed; flexor margin with 7 or 8 low triangular teeth, each bearing corneous movable spine, without slender movable spine at base of unguis. Epipods absent.

Egg diameter: 1.2 mm.

Colour in life. Unknown.

Etymology. Named after the type locality, Nias, Indonesia; used as a noun in apposition.

Remarks. Records of *Munidopsis tridentata* from off Sumatra, Indonesia (Doflein & Balss, 1913) collected by the Valdivia, are referable to *M. nias* sp. nov. *Munidopsis nias* sp. nov. is most similar to *M. acuminata* Benedict, 1902 (type locality: western Atlantic, off South Carolina) and *M. pubescens* Macpherson, 2007 (type locality: Madagascar) in sharing the broad, subquadrate, distally tridentate rostrum; unarmed dorsal surface of the carapace and abdomen; seven telson plates; short, squat, pereopods 2–4 with the length of the pereopod 2 merus not more than 2.5 times the width (versus about 3–4 times width) and two distal spines on the carpus. The new species differs from *M. acuminata* in lacking the epipod on the cheliped, having a straight or convex rather than slightly concave dorsal margin on the cheliped dactylus (Fig 4A, 5A, B) and the smooth versus rugose surface on the anterior half of the carapace. *Munidopsis nias* differs from *M. pubescens* in the smooth versus rugose anterior carapace surface, having a row of prominent spines on the extensor margin of the carpus of pereopods 2–4, a row of dorsal spines on the merus of the chelipeds and more extensive striation on the branchial regions of the carapace.

Variation in the type series of *M. nias* is slight, the main adult difference being in the number of mesial spines on the cheliped merus: two in the male holotype, one in the female paratypes. The juvenile female (pcl 4.0 mm) (Fig. 5A) has rudimentary pleopods and differs chiefly from the adults in having relatively more pronounced carapace spines, proportionally shorter chelipeds (twice pcl), fewer mesial and ventromesial spines on the merus of the chelipeds, and a proportionally shorter cheliped palm (slightly shorter than the dactylus versus longer in adults).

In addition to Indonesian material identified here as *M. nias* sp. nov., Doflein & Balss (1913) also reported material from off East Africa under the name *M. tridentata*. Given the strong similarities between *M. nias* and *M. pubescens*, Doflein & Balss' (1913) East African records are probably referable to the latter species. Baba & Poore's (2002: fig. 6D, 7C, 8C, 9E) record of *M. serricornis* from off Nias, Indonesia (Valdivia stn 198, 677 m), is referable to *M. nias*. Material reported by Laurie (1926) as *M. tridentata* from Saya de Malha could not be located for the present study (Matt Lowe, pers. com., UMC), but are tentatively referred to *M. pubescens* Macpherson, 2007, described from Madagascar. Laurie's (1926) account was brief, but consistent with *M. pubescens*: the extensor margins of the meri of the walking legs are spinose, the carpi of the walking legs have two distal spines and only a single longitudinal row of spines on the cheliped merus (always two or three rows in *M. nias*). The Saya de Malha specimens probably also lacked epigastric spines as in *M. pubescens*; were epigastric spines present, they would almost certainly have been mentioned given Laurie's (1926) succinct but detailed account of carapace and pereopodal spination. Saya de Malha is also geographically adjacent to the type locality of *M. pubescens*, Madagascar.

Distribution. Presently known only from the eastern Indian Ocean between Nias (Sumatra, Indonesia) and the Nicobar Islands; 646–805 m.

Munidopsis pyrochela sp. nov.

Figs 6, 9

Munidopsis sp.—O'Shea *et al.*, 1999: 51, fig. 27; Poore *et al.*, 2011, pl. 23F.

Munidopsis serricornis.—Baba & Poore, 2002: 241–244, figs. 6 A, B, 7A, 8A, 9A, B [part]; Ahyong & Poore, 2004: 46, 57; Poore, 2004: 235, 237, fig. 65g; Yaldwyn & Webber, 2011: 214.

Munidopsis cf. *serricornis*.—Webber *et al.*, 2010: 226; Taylor *et al.*, 2010: 15; Rowden *et al.*, 2011: 73.

Type material. (Chatham Rise, New Zealand). HOLOTYPE: NIWA 67818, male (cl 13.0 mm, pcl 9.3 mm), Ritchie Seamount, E Chatham Rise, 44°10.0–10.1'S 174°34.4–35.7'W, 836–1100 m, orange roughly trawl, TRIP 2551/82, sample 1, in crevice in glass sponge (*Farrea similis* Reiswig & Kelly), 18 December 2007. PARATYPES: NIWA 53274, 1 male (cl 7.2 mm, pcl 4.9 mm), 42°38.66–38.67'S 179°52.88–53.05'W, 1052–1080 m, Mummy Seamount, RV *Tangaroa*, TAN0905/48, 18 June 2009; NIWA 67819, 1 male (cl 15.0 mm, pcl 10.9 mm), 2 females (cl 11.9–15.3 mm, pcl 8.7–11.3 mm), Mummy Seamount, 42°38.69'S 179°53.01'W, 1052–1080 m, RV *Tangaroa*, TAN0905/48, 18 June 2009; NIWA 19203, 2 ovigerous females (cl 16.6–20.0 mm, pcl 11.8–14.6 mm), Zombie Seamount, 42°45.91–45.79'S 179°55.62–55.83'E, 990–1058 m, epibenthic sled, RV *Tangaroa*, TAN0104/198, 19 April 2001; NIWA 19205, 1 male (pcl 13.7 mm), 1 female (cl 19.3 mm, pcl 14.0 mm), Zombie Seamount, 42°45.99–46.08'S 179°55.36–55.18'W, 970–900 m, epibenthic sled, RV *Tangaroa*, TAN0104/337, 20 April 2001; NIWA 19204, 1 male (cl 15.3 mm, pcl 11.3 mm), 1 female (cl 11.4 mm, pcl 8.1 mm), Diabolical Seamount, 42°47.16–46.96'S 179°59.12–59.01'W, 993–900 m, epibenthic sled, RV *Tangaroa*, TAN0104/48, 16 April 2001; NIWA 19206, 2 females (cl 15.3–16.5 mm, pcl 11.2–12.2 mm), Diabolical Seamount, 42°47.16–46.96'S 179°59.12–59.01'W, 993–900 m, epibenthic sled, RV *Tangaroa*, TAN0104/48, 16 April 2001; NIWA 19207, 1 male (cl 12.5 mm, pcl 8.9 mm), 1 female (cl 16.0 mm, pcl 11.3 mm), Diabolical Seamount, 42°47.56–47.70'S 179°58.86–58.60'W, 950–900 m, epibenthic sled, RV *Tangaroa*, TAN0104/47, 16 April 2001; NIWA 67820, 1 male (cl 7.6 mm, pcl 5.4 mm), Voodoo Seamount, 42°44.74–44.61'S 179°55.41–55.11'W, 1051–1129 m, RV *Tangaroa*, TAN0905/42, 18 June 2009; NIWA 19200, 1 female (cl 27.1 mm, pcl 19.9 mm), Chatham Rise, 43°26.7'S 173°30.0'E, 392 m, S0181, dredge, 31 Oct 1979; NIWA 53916, 1 male (cl 15.5 mm, pcl 11.2 mm), 1 ovigerous female (cl 15.9 mm, pcl 11.6 mm), 1 female (cl 9.8 mm), Ritchie Seamount, 44°10.61'S 174°33.56'W, 760–960 m, with sponge, RV *Tangaroa*, TAN0905/107, 26 June 2009.

Other material examined.—Southern Kermadec Ridge, New Zealand: NIWA 64816, 1 male (cl 14.7 mm, pcl 10.9 mm), Rumble II West Seamount, 35°21.18'S 178°30.65'E, 1382–1416 m, TAN1007/106, epibenthic sled, 6 June 2010; NIWA 72432, 1 male (cl 13.5 mm, pcl 9.6 mm), Rumble II West Seamount, 35°21.42–21.62'S 178°30.95–31.09'E, 1387–1420 m, TAN1104/40, epibenthic sled, ES20, 8 March 2011; NIWA 72277, 1 male (cl 13.6 mm, pcl 9.5 mm), 1 ovigerous female (cl 15.6 mm, pcl 11.0 mm), Clark Seamount, 36°29.04–28.93'S 177°53.24–53.10'E, 1328–1272 m, TAN1104/20, epibenthic sled, ES10, 3 March 2011; NIWA 72926, 1 damaged male (cl ~19.3 mm, pcl ~14.3 mm), Lillie Seamount, 35°51.44–51.41'S 178°26.88–26.55'E, 1237–1460 m, TAN1104/124, epibenthic sled, ES59, 19 March 2011; NIWA 72879, 1 female (cl 17.5 mm, pcl 13.2 mm), Lillie Seamount, 35°51.65–51.39'S 178°26.90–26.67'E, 1251–1478 m, TAN1104/123, epibenthic sled, ES57, 19 March 2011. Chatham Rise, New Zealand: NIWA 24570, 2 males (cl 12.3–18.2 mm, pcl 8.3–12.8 mm), 3 females (cl 17.2–18.4 mm, pcl 12.5–13.6 mm), 42°45'S 179°56'W, 927–1030 m, AMA0501/011, 20 June 2005. The Snares, New Zealand: NIWA 19199, 4 ovigerous females (cl 14.5–19.1 mm, pcl 10.3–14.6 mm), 48°02.01'S 166°06.01'E, 935 m, TRIP 1171/12, Z9583, J. Wills, 25 November 1998. Macquarie Ridge, Southern Ocean: NIWA 39722, 1 male (cl 19.1 mm, pcl 13.6 mm), 50°05.43–05.31'S 163°28.92–28.32'E, 1077–1408 m, RV *Tangaroa*, TAN0803/33, 1077–1408 m, 1 April 2008. Tasmania, Australia: NIWA 19208, 1 female (cl 10.5 mm, pcl 7.6 mm), South Tasman Rise, Southern Ocean, 47°09.000'S 148°43.038'E, 936 m, Z9236, 15 August 1998; AM P61819, 2 males (cl 13.7–20.4 mm, pcl 10.0–15.4 mm), 2 females (cl 14.2–22.2 mm, pcl 10.5–16.3 mm), off St. Patricks Head, Tasmania, 41°35'S 148°14'E, 1100 m, trawl, FRV *Soela*, S05/87/15, K. Graham, 12 July 1987; NMV J58233, 1 ovigerous female (cl 23.6 mm, pcl 17.0 mm), Hill Z16 site, 44°17'32"S 147°04'01"E to

44°17'40"S 147°03'54"E, 1100–1300 m, epibenthic sled, coll. T. O'Hara & T. Costa, 2 April 2007; NMV J58240, 1 male (cl 13.9 mm, pcl 9.7 mm), 1 female (damaged, cl ~11.0 mm), Hill Z15 site, 44°13'54"S 147°28'22"E to 44°14'07"S 147°28'03"E, 1100–1350 m, epibenthic sled, coll. T. O'Hara & T. Costa, 3 April 2007; NMV J44746, 1 male (cl 15.4 mm, pcl 11.2 mm), "U" seamount, 82.8 km SSE of South East Cape, 44°19.20'S 147°07.20'E, 1083 m, trapline, FRV *Southern Surveyor*, stn SS1/97-41, coll. T. N. Stranks *et al.*, 27 January 1997. Southwest Indian Ridge, Indian Ocean: AM P92563, 1 ovigerous female (cl 14.3 mm, pcl 10.2 mm), Middle of What Seamount, 37°56.795'S 50°27.240'E, 1414 m, RRS *James Cook* cruise JC066, ROV *Keel 6000*, 12 February 2011; OUMNH.ZC.2013-01-008, 1 male (cl 16.6 mm, pcl 12.6 mm), Middle of What Seamount, 37°56.795'S 50°27.240'E, 1414 m, RRS *James Cook* cruise JC066, ROV *Keel 6000*, 12 February 2011.

Diagnosis. Rostrum broad, flat, medially carinate, trifid distally. Carapace with pair of epigastric spines, otherwise unarmed dorsally; surface of dorsal half with faint short striae; lateral margins with 4 spines (1 anterolateral, 3 branchial); posterior orbital margin transverse; outer orbital spine distinct. Abdominal tergites unarmed. Telson with 8 plates. Maxilliped 3 merus flexor margin with 2 or 3 spines. Cheliped carpus length less than twice width, dorsal surface unarmed; merus with 3 longitudinal rows of prominent spines (dorsal, mesial, ventromesial). Walking leg meri distinctly spinose along extensor margin; dactylus flexor margin with movable spines, and more slender movable spine at base of corneous unguis. Pereopods without epipods.

Description. *Carapace:* Moderately convex from side to side; covered with short, fine setae; surface of anterior half smooth, with few scattered, fine short striae; surface of posterior half with fine distinct striae. Cervical groove indistinct. Pair of epigastric spines. Posterior orbital margins transverse to slightly oblique, outer orbital spine prominent. Frontal margins oblique; anterolateral spine similar to outer orbital spine. Lateral margins broadly convex; with 2 spines on anterior branchial margin and spine (bifid on left side of holotype) at junction of anterior and posterior branchial margins. Rostrum broad, 0.4 pcl; trifid distally; apex slightly deflected dorsally; median carina distinct; lateral proximal margin convex. Posterior margin unarmed, medially concave. Pterygostomian flap with short diagonal striae; anterior margin blunt, angular.

Sternum: Sternite 3 about one-fourth width of sternite 4. Posterior margin of sternite 3 contiguous with anterior margin of sternite 4. Sternites smooth, sparsely setose, unarmed.

Abdomen: Tergites with short, fine, scattered setae, unarmed. Tergites 2–4 with elevated anterior ridge; tergites 2 and 3 also with shallow groove behind anterior ridge. Tergites 4 and 5 with shallow, medially interrupted, transverse groove. Tergite 6 smooth; posterior margin not strongly produced. Telson composed of 8 plates (minute central plate present); lateral margin of midlateral plate lined with coarse, relatively stiff setae in males, distally setose in females. Uropodal endopod lateral margins setose, unarmed.

Eye: Ocular peduncle unarmed, dorsally setose; movable; partially concealed by rostrum. Cornea subglobular, slightly wider than peduncle. Small, slender spine adjacent to lateral margin of eye.

Antennule: Basal article squat, with 2 distolateral spines, dorsal shorter; distomesial margin with short triangular tooth.

Antenna: Basal article with triangular mesial and lateral tooth, neither overreaching article 2. Article 2 with strong distolateral spine, reaching beyond midlength but not apex of article 3. Article 3 with distomesial spine. Article 4 with

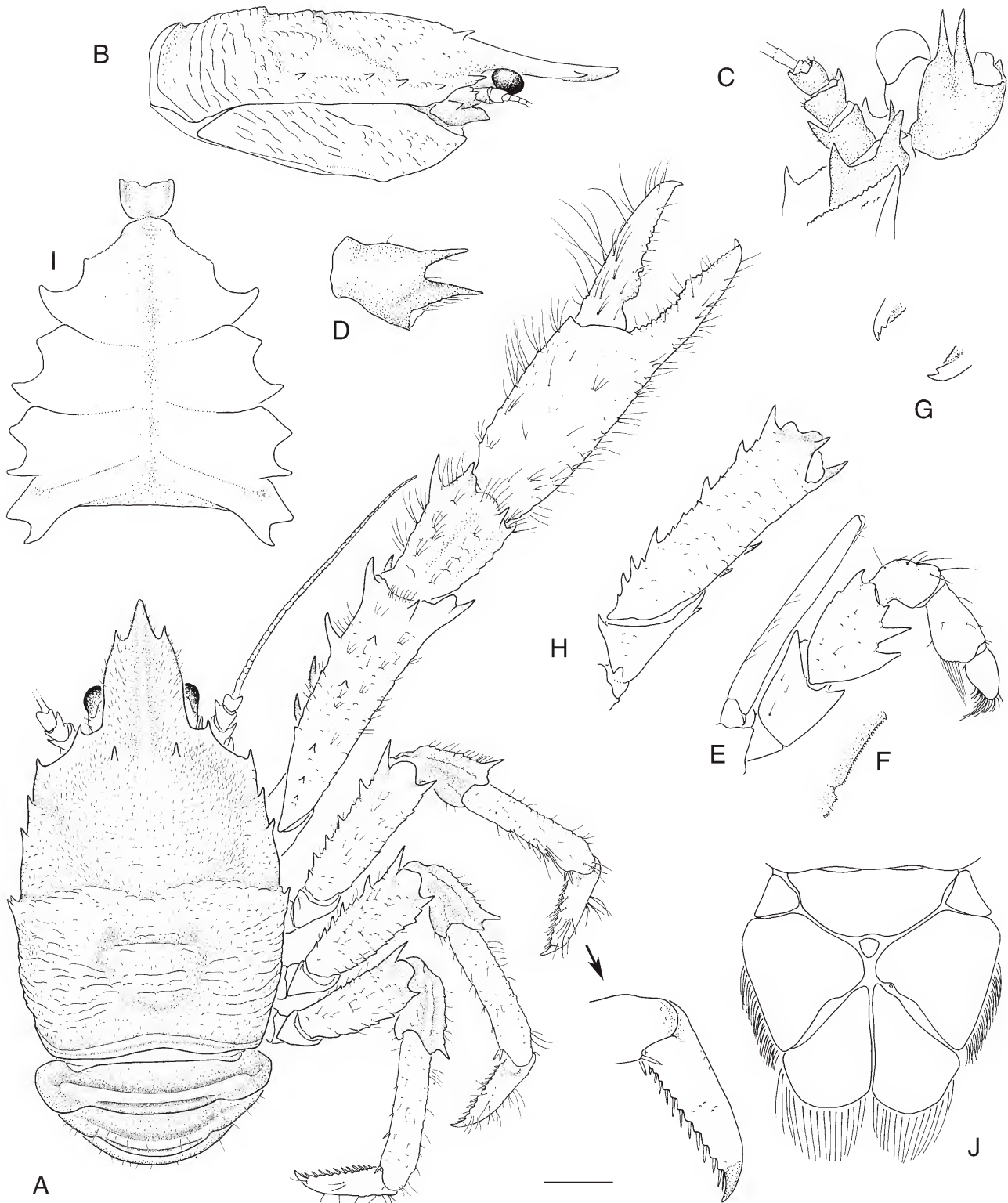


Figure 6. *Munidopsis pyrochela* sp. nov., male holotype, cl 13.0 mm, pcl 9.3 mm (NIWA 67818). (A) dorsal habitus; (B) carapace, right lateral view; (C) right antenna and antennules, ventral view; (D) right basal antennular article, lateral view; (E) right maxilliped 3; (F) right crista dentata; (G) right cheliped finger tips, ventral view; (H) right cheliped ischiomerus, lateral view; (I) sternal plastron; (J) telson. Scale: A, B, G–I = 2.0 mm; C–F, J = 1.0 mm.

lateral triangular projection. Flagellum slightly shorter than carapace length.

Maxilliped 3: Dactylus, propodus and carpus unarmed. Merus extensor margin with 2 small, blunt to acute tubercles and distal spine; flexor margin with 2 large triangular spines proximally and 1 or 2 smaller spines distally. Ischium longer than wide, with distal flexor and extensor spine.

Pereopod 1 (cheliped): Elongate, 2.2–2.9 pcl (males), 2.0–3.0 pcl (females); with tufts of long, simple golden setae, most numerous on mesial and lateral margins; subcylindrical to ovate. Ischium with ventrodorsal spine and dorsal spine. Merus with row of 6–8 strong, graded dorsal spines, largest distally; mesial margin with 2 large mesial spines, one distally at carpal articulation, one slightly distal to midlength of margin; ventromesial margin with 1–3 (usually 2) strong spines proximally and distal spine. Carpus 1.5–1.7 times longer than wide; mesial margin with distal and subdistal spine, latter largest; distodorsal and distoventral spine. Propodus unarmed, palm 2.0–2.5 times as long as wide; mesial margin of palm longer than dactylus. Pollex and dactylus occlusal margins crenulated, apices with interlocking teeth; pollex occlusal margin with low tooth at midlength; dactylus occlusal margin with 2 or 3 proximal teeth. Epipod absent.

Pereopods 2–4: Slightly compressed; decreasing in length posteriorly; with scattered, setose striae. Merus elongate; length about 3.1–3.9 times width (pereopod 2) to 2.4–3.1 (pereopod 4); extensor margin with prominent upright spines (pereopods 2 and 3) or serrated (pereopod 4); distal extensor margin with large distal spine; flexor margin irregular to serrated but not spinose except for strong distal spine. Carpus with distal extensor spine and irregular or serrated margin (occasionally spinular on pereopods 2 and 3); with low, irregular, dorsal carina. Propodus extensor margin irregular, unarmed; flexor margin with movable spine at distal one-third to one-fourth and paired movable spines distally adjacent to dactylar articulation. Dactylus about two-thirds propodus length; extensor margin with scattered setae, unarmed; flexor margin with 9–11 low triangular teeth, each bearing corneous movable spine and more slender movable spine at base of corneous unguis. Epipods absent.

Egg diameter: 1.6–1.8 mm.

Colour in life. Carapace and abdomen off-white; lateral margins and ridges with pale orange-brown marks. Chelipeds deep orange-red. Walking legs off-white. Cornea pale pink. The holotype is depicted in colour by Poore *et al.* (2011, pl. 23F).

Etymology. Derived from the Latin *pyro*, fire and *chela*, alluding to the orange-red chelipeds of the new species.

Remarks. Most previous records of *M. serricornis* from southeastern Australia are based on *M. pyrochela* sp. nov. (see Baba & Poore, 2002; Ahyong & Poore, 2004). *Munidopsis pyrochela* is readily distinguished from *M. serricornis*, however, by the presence of epigastric spines on the carapace and the colour in life, in which the carapace and walking legs are whitish rather than orange. Of the *serricornis*-complex species, *M. pyrochela* sp. nov. most closely resembles those having a pair of epigastric spines and spinose extensor margins of the walking legs, namely

M. spiridonovi sp. nov., *M. mina* Benedict, 1902 from the eastern Pacific, and two western Atlantic species, *M. tridens* (A. Milne-Edwards, 1880) and *M. transtridens* Pequegnat & Pequegnat, 1971.

Munidopsis pyrochela differs from *M. transtridens* in the less slender cheliped carpus with a length less than twice the width (versus about 2.5–3 times width). From *M. mina*, *M. pyrochela* is readily distinguished by the presence of a prominent spine on the mesial margin of the carpus of the cheliped in addition to a small distal spine adjacent to the propodal articulation, rather than only a small distal spine. From *M. tridens*, *M. pyrochela* differs in having eight rather than seven telson plates, and three instead of two longitudinal rows of spines on the merus of the cheliped.

The presence of epigastric and lateral carapace spines is remarkably consistent in *M. pyrochela*, being present in all specimens including the smallest specimen examined (male, pcl 4.9 mm, NIWA 53274). The larger western Indian Ocean specimen (male, pcl 12.6 mm, OUMNH.ZC.2013-01-008) initially appeared to lack epigastric spines, but close inspection revealed that the spines were broken. Australian and New Zealand specimens usually have an irregular or serrated extensor carpal margin on the walking legs, but on pereopods 2 and 3, up to three of these serrations may be developed as spines, as in the two western Indian Ocean specimens. A specimen from The Snares (NIWA 19199) and a western Indian Ocean specimen (AM P92563) are the smallest ovigerous females at pcl 10.3 mm and pcl 10.2 mm, respectively.

The strongly disjunct distribution of *M. pyrochela*, between southern Australia and the western Indian Ocean, is conspicuous. The level of sampling from intermediate localities in the southern Indian Ocean, however, is presently inadequate to determine if the disjunction is real or artefactual. Material from both regions are similar, the two western Indian Ocean specimens being less setose dorsally than the Australian and New Zealand examples; the significance of these differences requires further study, especially given the apparent distributional disjunction. A similar disjunction applies also to the deep-water caridean shrimp, *Leontocaris bulga* Taylor & Poore, which is known from Tasmania and off southeast Africa (Komai & Chan, 2010).

Munidopsis pyrochela is a common seamount species and the most southerly occurring species of the *serricornis* complex, ranging into Subantarctic waters. The typical habitat of *M. pyrochela* remains to be confirmed, although the holotype was collected from a crevice in a hexactinellid glass sponge *Farrea similis* Reischwig & Kelly, and other specimens were collected together with various other species of hexactinellids. *Munidopsis pyrochela* has not yet been confirmed from deepwater corals, unlike *M. serricornis*, which is a known associate of the arborescent *Lophelia pertusa* in the northern Atlantic (Lavaleye *et al.*, 2009).

Distribution. Southwest Indian Ridge (Middle of What Seamount), New Zealand and south-eastern Australia, ranging in the east from the southern Kermadec Ridge and The Snares, south to the Macquarie Ridge and westwards to Tasmania including the South Tasman Rise and Cascade Plateau; 392–1414, usually 900–1000 m.

Munidopsis spiridonovi sp. nov.

Figs 7–9

Type material. HOLOTYPE: AM P92562, female (cl 18.2 mm, pcl 12.8 mm), Coco-de-Mer Ridge, 01°06.5'N 56°28.7'E, 1280–1380 m, Cruise 36, stn 3779, 1280–1380 m, RV *Akademik Kurchatov*, 4 May 1983. PARATYPE: ZMM, male (cl 18.8 mm, pcl 13.1 mm), collected with holotype.

Other material examined.—**Southeast Indian Ridge, Indian Ocean:** MNHN IU-2011-5083, 2 juvenile females (cl 8.2 mm, pcl 5.7 mm; cl 8.1 mm, pcl 5.7 mm), near Amsterdam Island, 37°47.20'S 77°38.98'E, 940–1680 m, JASUS CP7, MD50, 9 July 1986.

Diagnosis. Rostrum broad, flat, medially carinate, trifid distally. Carapace with pair of epigastric spines, otherwise unarmed dorsally; surface of dorsal half with granules and short rugae; lateral margins with 4 spines (1 anterolateral, 3 branchial); posterior orbital margin transverse; outer orbital spine distinct. Abdominal tergites unarmed. Telson with 8 plates. Maxilliped 3 merus flexor margin with 3 spines. Cheliped carpus length more than twice width, dorsal surface with row of spines; merus with 3 longitudinal rows of prominent spines (dorsal, mesial, ventromesial). Walking leg meri distinctly spinose along extensor margin; dactylus flexor margin lined with movable spines, distalmost at base of corneous unguis. Pereopods without epipods.

Description of adults. *Carapace:* Moderately convex from side to side; covered with short, fine setae; surface of anterior half with granules and short rugae; surface of posterior half with short rugae and distinct striae. Cervical groove indistinct. Pair of epigastric spines. Posterior orbital margins transverse to slightly oblique, outer orbital spine prominent. Frontal margins oblique, slightly concave; anterolateral spine similar to outer orbital spine. Lateral margins broadly convex; with 2 spines on anterior branchial margin and spine at junction of anterior and posterior branchial margins. Rostrum broad, 0.4 pcl; trifid distally; apex horizontal or slightly deflected dorsally; median carina distinct; lateral proximal margin convex. Posterior margin unarmed, medially emarginated. Pterygostomial flap with short diagonal striae; anterior margin blunt, angular.

Sternum: Sternite 3 about 0.3 width of sternite 4. Posterior margin of sternite 3 contiguous with anterior margin of sternite 4. Sternites smooth, sparsely setose, unarmed.

Abdomen: Tergites with short, fine, scattered setae, without spines. Tergites 2–4 with elevated anterior ridge; tergites 2 and 3 also with shallow groove behind anterior ridge. Tergites 4 and 5 with shallow, medially interrupted, transverse groove. Tergite 6 smooth; posterior margin not strongly produced. Telson composed of 8 plates (minute central plate present); lateral margin of midlateral plate lined with coarse, relatively stiff setae in males, distally setose in females. Uropodal endopod lateral margins setose, unarmed.

Eye: Ocular peduncle unarmed, sparsely setose; movable; partially concealed by rostrum. Cornea subglobular, slightly wider than peduncle. Small, slender spine adjacent to lateral margin of eye.

Antennule: Basal article squat, with 2 distolateral spines, dorsal shorter; distomesial margin with short triangular tooth.

Antenna: Basal article with triangular mesial and lateral tooth, neither overreaching article 2. Article 2 with strong distolateral spine, reaching midlength but not apex of article 3. Article 3 with distomesial spine. Article 4 unarmed. Flagellum slightly shorter than pcl.

Maxilliped 3: Dactylus, propodus and carpus unarmed. Merus extensor margin with 2 small, blunt to acute tubercles and distal spine; flexor margin with 2 large triangular spines proximally and 1 or 2 smaller spines distally. Ischium longer than wide, with distal flexor and extensor spine.

Pereopod 1 (cheliped): Cheliped elongate, 3.7 pcl (male paratype), 3.6 pcl (female holotype); with tufts of long, simple golden setae, most numerous on mesial and lateral margins; subcylindrical to ovate. Ischium with ventrodorsal spine and dorsal spine. Merus with row of 8 or 9 strong, graded dorsal spines, largest distally; mesial margin with distal row of 3 or 4 mesial spines, largest distally at carpal articulation; ventromesial margin with longitudinal row of 3 strong spines proximally and distal spine. Carpus 2.1–2.3 times longer than wide; mesial margin with distal and subdistal spine, latter largest; distodorsal spine followed by longitudinal row of 1–5 (usually 3 or more) dorsal spines; distoventral spine. Propodus unarmed, palm 2.8–3.1 times as long as wide; mesial margin of palm about 1.5 times longer than dactylus. Pollex and dactylus occlusal margins crenulated, apices with interlocking teeth; pollex occlusal margin with proximal gape (more pronounced in male) and low tooth slightly distal to midlength; dactylus occlusal margin with proximal swelling, forming subquadrate tooth on male. Epipod absent.

Pereopods 2–4: Slightly compressed; decreasing in length posteriorly; with scattered, setose striae. Merus elongate; length 4.0–4.1 times width (pereopod 2) to 3.1 (pereopod 4); extensor margin lined with prominent upright spines, longest on pereopod 2, shortest on pereopod 4; distal extensor margin with large distal spine; flexor margin serrated, 1 or 2 occasionally forming short spine in addition to strong distal spine. Carpus with row of 4 or 5 extensor spines (pereopod 2), 1 or 2 extensor spines (pereopod 3), 1 distal extensor spine and serrated margin (pereopod 4); low, irregular, dorsal carina. Propodus extensor margin irregular, unarmed; flexor margin with movable spine at distal one-fourth and paired movable spines distally adjacent to dactylar articulation. Dactylus about 0.6 propodus length; extensor margin with scattered setae, unarmed; flexor margin with 10–12 low triangular teeth, each bearing corneous movable spine, distalmost movable spine at base of corneous unguis. Epipods absent.

Egg diameter: 1.3 mm.

Colour in life. Unknown.

Etymology. Named for Vassily Spiridonov, for kindly making material available for study and for his important contributions to decapod systematics.

Figure 7 [facing page]. *Munidopsis spiridonovi* sp. nov. A–L: female holotype, cl 18.2 mm, pcl 12.8 mm, (AM P92562); M–N, male paratype, cl 18.8 mm, pcl 13.1 mm (MMZ). (A) dorsal habitus; (B) carapace, right lateral view; (C) right antenna and antennule, ventral view; (D) right basal antennular article, lateral view; (E) right maxilliped 3; (F) right crista dentata; (G) right cheliped finger tips, ventral view; (H) right cheliped ischiomerus and carpus, lateral view; (I) right ischiomerus and carpus, mesial view; (J) left cheliped carpus, dorsal view; (K) sternal plastron; (L) telson. Scale: A, B, G–J = 2.0 mm; C–F, K–L = 1.0 mm.

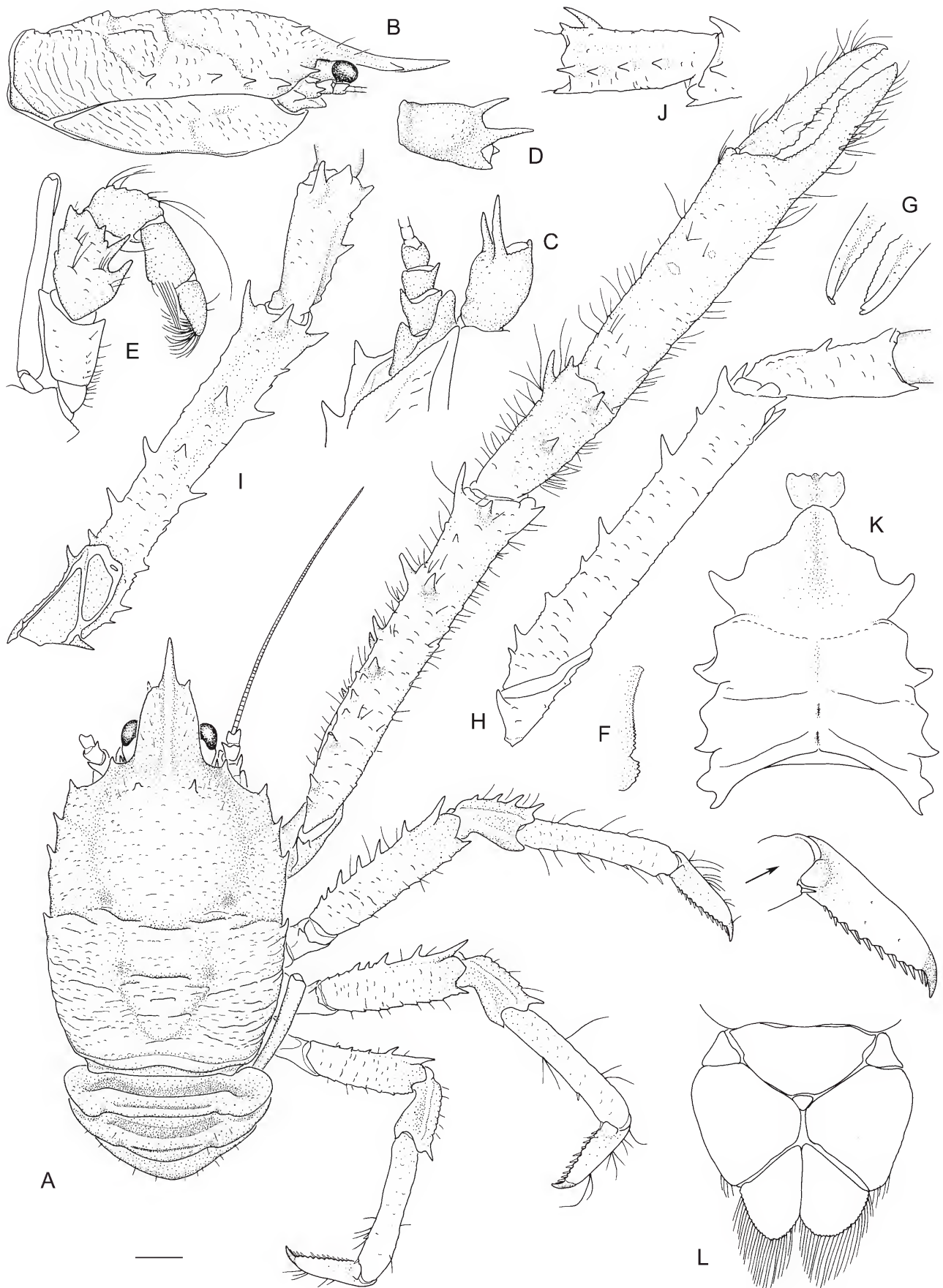


Figure 7. *Munidopsis spiridonovi* sp. nov. [caption on facing page, p. 210]

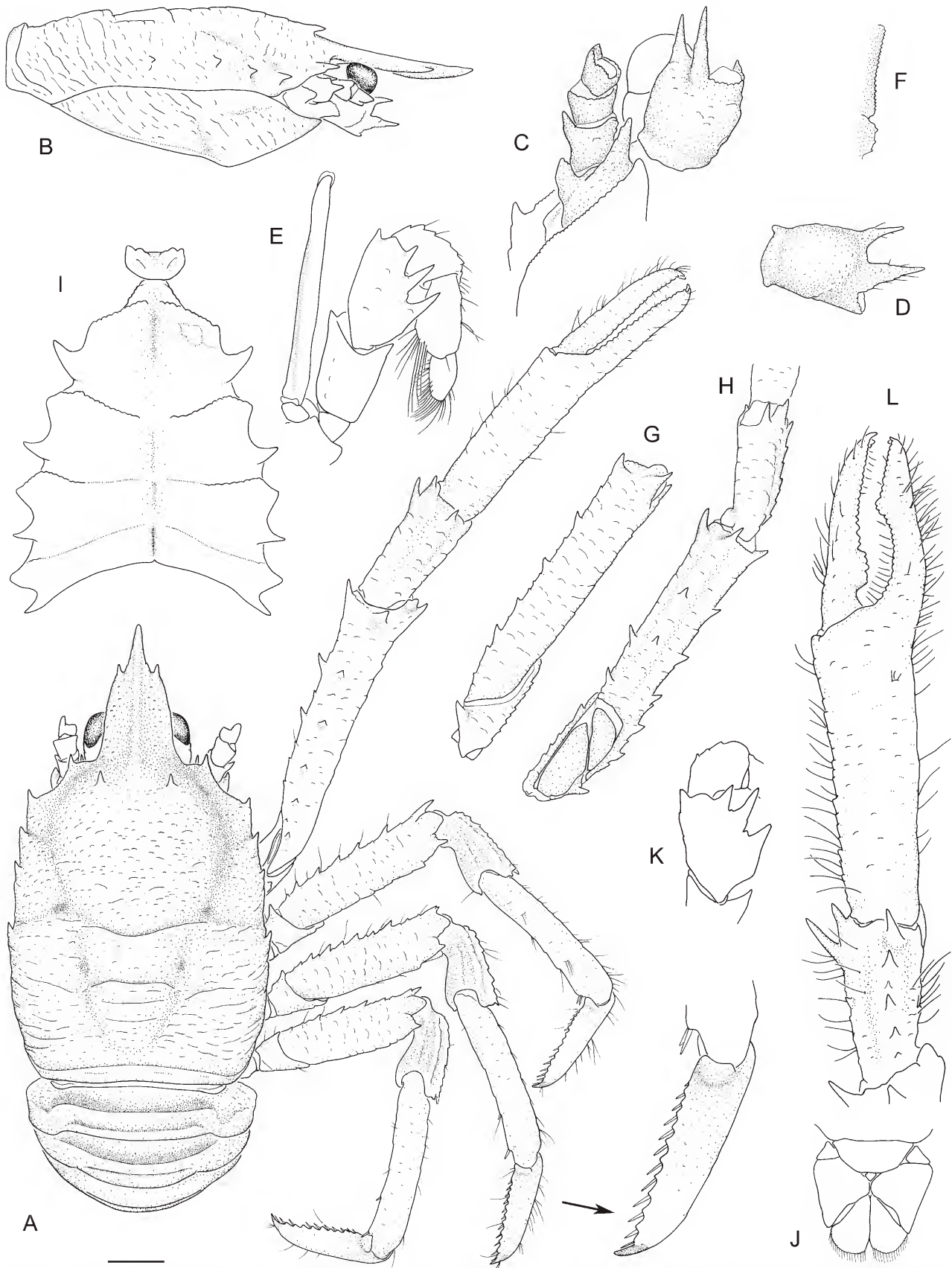


Figure 8. *Munidopsis spiridonovi* sp. nov. A–K: juvenile female, cl 8.2 mm, pcl 5.7 mm (MNHN IU-2011-5083). L–M, male paratype, cl 18.8 mm, pcl 13.1 mm (MMZ). (A) dorsal habitus; (B) carapace, right lateral view; (C) right antenna and antennule, ventral view; (D) right basal antennular article, lateral view; (E) right maxilliped 3; (F) right crista dentata; (G) right cheliped ischiomerus, lateral view; (H) right carpus and ischiomerus, mesial view; (I) sternal plastron; (J) telson; (K) right maxilliped 3 carpus and merus; (L) right cheliped carpus to dactylus. Scale: A, B, G, H, J = 1.0 mm; C–F, I = 0.5 mm; L–M = 2.3 mm.

Remarks. Among the *serricornis*-complex species, *Munidopsis spiridonovi* sp. nov. is closest to *M. pyrochela* sp. nov. and the western Atlantic *M. transtridens* in sharing a pair of epigastric spines, spinose extensor margins of the walking leg meri, and a prominent mesial spine on the cheliped carpus. Adult *M. spiridonovi* differs from *M. pyrochela* in having more elongate chelipeds, with the carpi armed with a row of dorsal spines, and carpal length more than twice width versus less than twice width. The cheliped length of adult *M. spiridonovi* exceeds 3.6 pcl whereas the chelipeds of *M. pyrochela* do not exceed 3.0 pcl. *Munidopsis spiridonovi* is very similar to *M. transtridens* in proportions and spination of the cheliped carpus (according to Mayo, 1974), but differs in having a markedly less setose carapace (sparse, short scarcely visible setae versus long prominent setae) and more elongate chelipeds in adults. The proportional length of the cheliped palm in adult *M. spiridonovi* is about 1.5 times dactyl length (versus 1.3 or less in *M. transtridens*), the cheliped merus is distinctly longer than pcl (almost as long as cl) rather than being about as long as pcl, and the cheliped length is greater than 3.6 pcl compared to about 3.0 pcl.

Variation between the male and female type specimens is slight, being most marked in the sexually dimorphic chelae in which the male cheliped fingers have a distinct versus slight gape (Fig. 7A, 8L). The carpus of the cheliped of the holotype has a dorsal row of two spines on the right side, four on the left (Fig. 8A, J). The male paratype has six dorsal carpal spines. The merus of maxilliped 3 is armed with three flexor spines, of which the distalmost ranges from smaller than to as large as the other two spines (Fig. 7E, 8K). The two juvenile females from the Southeast Indian Ridge (Fig. 8A–J), although lacking the row of carpal spines on the cheliped, are presently assigned to *M. spiridonovi*. They agree well with the adults in almost all features, but have a row of raised angular, dorsal prominences on the cheliped carpus rather than spines, an unarmed carpal extensor margin (excluding the distal spine) on pereopod 2, less prominent meral extensor spines on the walking legs, and a proportionally shorter cheliped in which the length is about 2.5 pcl with merus slightly shorter than pcl and palm about 1.2 times dactylus length. Although these juveniles potentially represent a different species in which diagnostic characters are yet to be fully expressed, each of the aforementioned differences between adults and juveniles are consistent with expected allometric changes in *M. spiridonovi*, and parallel changes in *M. transtridens*, which may also have a dorsal row of carpal spines on the cheliped in adults (Pequegnat & Pequegnat, 1971; Mayo, 1974; Tavares *et al.*, 2008).

Distribution. Western Indian Ocean from seamounts on the Coco-de-Mer Ridge and the Southeast Indian Ridge, near Amsterdam Island; 940–1680 m.

Discussion

The discovery of six new *Munidopsis serricornis*-complex species documented here demonstrates the wide distribution of the group throughout the Indo-West Pacific. The majority of *serricornis*-complex species share a rostrum with typically convex margins, unarmed or spinose carapace margins, seven or eight (usually eight) telson plates, two or more prominent flexor spines on the maxilliped 3 merus, all pereopods without epipods, presence of a slender flexor spine or thick seta arising from the base of (and usually lying against) the unguis of pereopods 2–4. These include *M. serricornis* (Lovén, 1852), *M. crinita* Faxon, 1893, *M. mina* Benedict, 1902, *M. modesta* Benedict, 1902, *M. tridens* (A. Milne-Edwards, 1880), *M. transtridens* Pequegnat & Pequegnat, 1971, from the Atlanto-East Pacific, and *M. pyrochela* sp. nov., *M. alcocki* sp. nov., *M. spiridonovi* sp. nov., *M. ternaria* Macpherson, 2007, *M. comarge* Taylor, Ahyong & Andreakis, 2010, *M. macphersoni* sp. nov. and *M. atlantis* sp. nov., from the Indo-West Pacific. *Munidopsis treis* Ahyong & Poore, 2004 is superficially similar to *M. serricornis* on the basis of its trifold rostrum and unarmed dorsal surface but is excluded from the *serricornis* complex; it differs from all other *serricornis*-complex species in having the posterior orbital margins and frontal margins of the carapace in-line and sloping posteriorly at the same angle, as in *M. trifida* Henderson, 1885, and *M. kareenae* Ahyong, 2013.

Within the *serricornis* complex, three species (*M. acuminata* Benedict, 1902, *M. pubescens* Macpherson, 2007, and *M. nias* sp. nov.) differ from remaining species in the combination of a relatively short, broad, subquadrate rostrum, absence of epigastric spines, seven telson plates, cheliped with or without an epipod, one or two (usually one) flexor spines on the merus of maxilliped 3, proportionally short, squat pereopods with the pereopod 2 merus length not more than 2.5 times the width, in having two distal spines on the carpus of the walking legs, and absence of a slender flexor spine or thick seta arising from the base of the unguis of pereopods 2–4. *Munidopsis acuminata* Benedict, 1902, *M. pubescens* Macpherson, 2007, and *M. nias* sp. nov. form a discrete group within the *serricornis* complex suggesting common ancestry of the three species.

Present results demonstrate that *Munidopsis serricornis* is not cosmopolitan, but restricted to the Atlantic Ocean. All previous Indo-Pacific records of *M. serricornis* are referable to other species, most of which are newly described here: *M. alcocki* sp. nov., *M. pyrochela* sp. nov. and *M. nias* sp. nov. Other new species described herein have been discovered *de novo*: *M. atlantis* sp. nov., *M. macphersoni* sp. nov. and *M. spiridonovi* sp. nov.

Previous records of *M. serricornis* from the northern Indian Ocean (Alcock & Anderson, 1899a, b; Alcock, 1901) and off Madagascar (Macpherson, 2007) are based on *M. alcocki*. Records of *M. serricornis* (as *M. tridentata*) from the eastern Indian Ocean off Nias (Indonesia) reported by Doflein & Balss (1913) (later figured by Baba & Poore, 2002) are referable to *M. nias*. Laurie's (1926) record of *M. tridentata* from Saya de Malha is probably referable to *M. pubescens* Macpherson, 2007, described from Madagascar (see account of *M. nias*).

Records of *Munidopsis serricornis* (as *M. tridentata*) from the Philippines and south-eastern Indonesia by Baba (1988, 2005) are referable to *M. comarge* and *M.*

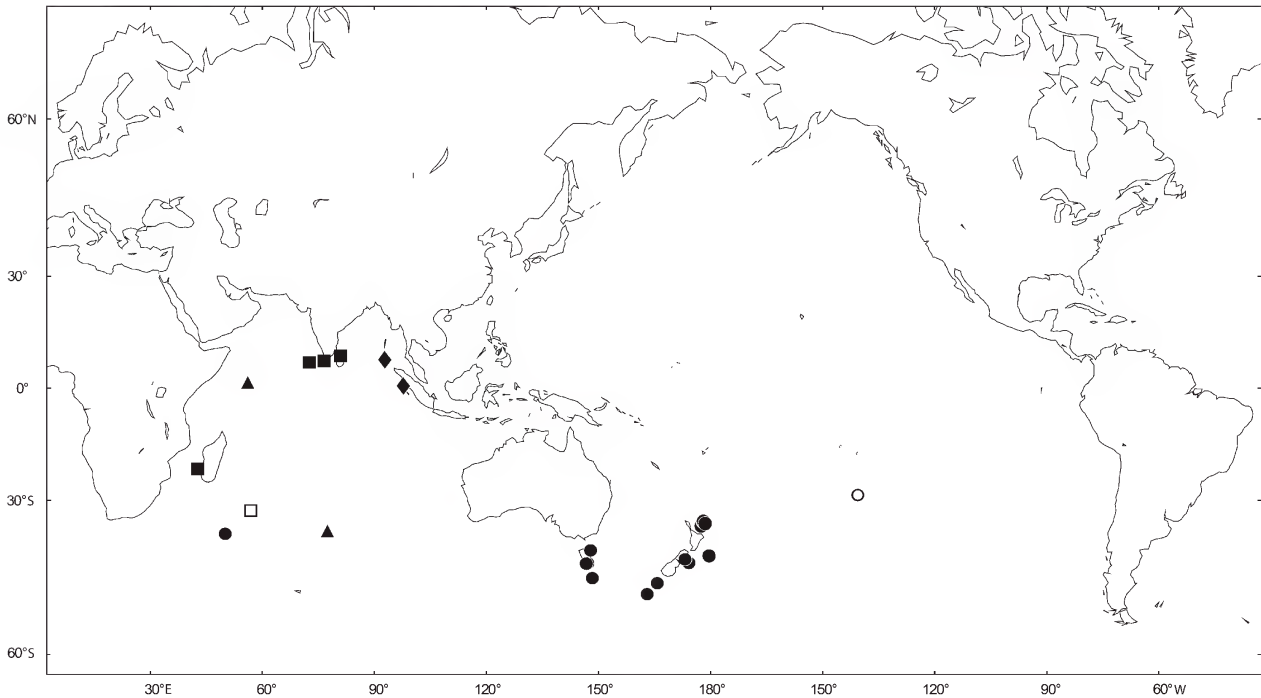


Figure 9. Known distribution of (■) *Munidopsis alcocki* sp. nov., (□) *M. atlantis* sp. nov., (○) *M. macphersoni* sp. nov., (◆) *M. nias* sp. nov., (●) *M. pyrochela* sp. nov., (▲) *M. spiridonovi* sp. nov.

ternaria, respectively (USNM specimens re-examined in 2013). Similarly, the New Zealand records of *M. comarge* (Taylor *et al.*, 2011) are here referred to *M. ternaria* (NIWA specimens re-examined in 2013). Thus, *M. comarge* ranges from southern and western Australia to the Philippines and Taiwan, and *M. ternaria* ranges from New Zealand to New Caledonia and southeastern Indonesia (Osawa *et*

al., 2008; Baba *et al.*, 2009; Lin & Chan, 2011). Previous records of *M. serricornis* from Pacific-Asian localities are all based on *M. comarge* and *M. ternaria*. Previous records of *M. serricornis* from Australia are based on *M. treis*, *M. comarge* and *M. pyrochela*. The updated identity of previous records of *M. serricornis* and its synonyms from the Indo-West Pacific is given in Table 1.

Table 1. Identity of previous Indo-West Pacific records of *Munidopsis serricornis* and its synonyms (*M. rosacea* and *M. tridentata*).

Reference	Locality	Reported name	Current name
Alcock & Anderson (1899a,b)	Laccadive Sea	<i>M. ?rosacea</i> <i>M. rosacea</i>	<i>M. alcocki</i>
Alcock (1901)	Bay of Bengal; Laccadive Sea; Maldives	<i>M. tridentata</i>	<i>M. alcocki</i>
Doflein & Balss (1913)	Nias, Indonesia	<i>M. tridentata</i>	<i>M. nias</i>
Doflein & Balss (1913)	Off Somalia	<i>M. tridentata</i>	<i>M. pubescens</i>
Laurie (1926)	Saya de Malha Bank	<i>M. tridentata</i>	<i>M. pubescens</i>
Baba (1988)	Obi, Indonesia	<i>M. tridentata</i>	<i>M. ternaria</i>
Baba (1988); Komai (2000)	Sulu Sea, Philippines	<i>M. tridentata</i>	<i>M. comarge</i>
Baba & Poore (2002)	South-eastern Australia	<i>M. serricornis</i>	<i>M. pyrochela</i> <i>M. comarge</i> <i>M. treis</i>
Baba & Poore (2002)	Nias, Indonesia	<i>M. serricornis</i>	<i>M. nias</i>
Ahyong & Poore (2004); Poore (2004)	South-eastern Australia	<i>M. serricornis</i>	<i>M. pyrochela</i>
Baba (2005)	Mindanao Sea, Philippines	<i>M. serricornis</i>	<i>M. comarge</i>
Macpherson (2007)	Madagascar	<i>M. serricornis</i>	<i>M. alcocki</i>
Poore <i>et al.</i> (2008)	Western Australia	<i>M. serricornis</i>	<i>M. comarge</i>
Baba <i>et al.</i> (2009)	Taiwan	<i>M. serricornis</i>	<i>M. comarge</i>
Webber <i>et al.</i> (2010); Rowden <i>et al.</i> (2011)	New Zealand	<i>M. cf. serricornis</i>	<i>M. pyrochela</i>
Yaldwyn & Webber (2011)	New Zealand	<i>M. serricornis</i>	<i>M. pyrochela</i>

ACKNOWLEDGMENTS. Thanks to Oliver Coleman (ZMB), Laure Corbari (MNHN), Jørgen Oleson and Tom Schiøtte (ZMUC), and Vassily Spiridonov (ZMM) for the loan of specimens; Matt Lowe (University Museum, Cambridge), Sammy De Grave (OUMNH) for searching their respective collections; Rafael Lemaitre and Karen Reed (both USNM) and Kareen Schnabel (NIWA) for their hospitality during visits to their respective collections in 2013. Enrique Macpherson is also gratefully acknowledged for facilitating study of specimens from the ZMM and OUMNH. Jo Taylor and Tomoyuki Komai are thanked for their constructive reviews of the manuscript. New Zealand specimens examined herein were collected under the NIWA research programmes “Ocean Ecosystems” (C01X0223, C01X027), “Seamounts: their importance for fisheries and marine ecosystems (C01X0224)”, and by the Scientific Observers Programme, both funded by the New Zealand Ministry of Fisheries.

References

- Ahyong, S. T. 2013. *Munidopsis kareenae*, a new species of seamount squat lobster from New Zealand with a key to the New Zealand species of *Munidopsis* (Crustacea: Decapoda: Munidopsidae). *Zootaxa* 3599: 490–494.
<http://dx.doi.org/10.11646/zootaxa.3599.5.6>
- Ahyong, S. T., N. Andreakis, and J. Taylor. 2011. Mitochondrial phylogeny of the deep-sea squat lobsters, Munidopsidae (Galatheoidea). *Zoologischer Anzeiger* 250: 367–377.
<http://dx.doi.org/10.1016/j.jcz.2011.06.005>
- Ahyong, S. T., and G. C. B. Poore. 2004. Deep-water Galatheidæ (Crustacea: Decapoda: Anomura) from southern and eastern Australia. *Zootaxa* 472: 3–76.
- Alcock, A. 1901. *A Descriptive Catalogue of the Indian deep-sea Crustacea Decapoda Macrura and Anomala, in the Indian Museum. Being a Revised Account of the Deep-sea Species Collected by the Royal Indian Marine Survey Ship Investigator*. Trustees of the Indian Museum, Calcutta, 286 pp., 3 pls.
- Alcock, A., and A. R. S. Anderson. 1899a. Natural history notes from H.M. Royal Indian marine survey ship ‘Investigator’, commander T. H. Heming, R. N., commanding.—Series III, No. 2. An account of the deep-sea Crustacea dredged during the surveying season of 1897–98. *Annals and Magazine of Natural History (ser. 7)* 3: 1–27.
- Alcock, A., and A. R. S. Anderson. 1899b. *Crustacea, Part VII. Illustrations of the zoology of the Royal Indian Marine Surveying Steamer Investigator*. Trustees of the Indian Museum, Calcutta, pls 36–45.
- Baba, K. 1988. Chirostylid and galatheid crustaceans (Decapoda: Anomura) of the “Albatross” Philippine Expedition, 1907–1910. *Researches on Crustacea, Special Number 2*: 1–203.
- Baba, K., 2005. Deep-sea chirostylid and galatheid crustaceans (Decapoda: Anomura) from the Indo-West Pacific, with a list of species. *Galathea Reports* 20: 1–317.
- Baba, K., and G. C. B. Poore. 2002. *Munidopsis* (Decapoda, Anomura) from south-eastern Australia. *Crustaceana* 75: 231–252.
<http://dx.doi.org/10.1163/156854002760095363>
- Baba, K., S. T. Ahyong, and E. Macpherson. 2011. Morphology of marine squat lobsters. In *The Biology of Squat Lobsters*, ed. G. C. B. Poore, S. T. Ahyong, and J. Taylor, pp. 1–37. Melbourne: CSIRO Publishing.
- Baba, K., E. Macpherson, G. C. B. Poore, S. T. Ahyong, A. Bermudez, P. Cabezas, C.-W. Lin, M. Nizinski, C. Rodrigues, and K. Schnabel. 2008. Catalogue of squat lobsters of the world (Crustacea: Decapoda: Anomura—families Chirostylidae, Galatheidæ and Kiwaidæ). *Zootaxa* 1905: 1–220.
- Baba, K., E. Macpherson, C.-W. Lin, and T.-Y. Chan. 2009. *Crustacean Fauna of Taiwan: squat lobsters (Chirostylidae and Galatheidæ)*. National Science Council, Taiwan, R. O. C., Taipei, pp. 312.
- Benedict, J. E. 1902. Description of a new genus and forty six new species of crustaceans of the family Galatheidæ with a list of the known marine species. *Proceedings of the Biological Society of Washington* 26(1311): 243–334.
- Doflein, F., and H. Balss. 1913. Die Galatheiden der Deutschen Tiefsee-Expedition. *Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer “Valdivia” 1898–1899* 20: 125–184, pls 12–17.
- Esmark, L. 1857. Om *Galathea tridentata*. Forhandlinger Skandinaviske Naturforskeres Møte (7) 1(1856): 239–240.
- Faxon, W. 1893. Reports on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U.S. Fish Commission Steamer “Albatross”, during 1891, Lieut.-Commander Z.L. Tanner, U.S.N., commanding. VI. Preliminary descriptions of new species of Crustacea. *Bulletin of the Museum of Comparative Zoology at Harvard College* 24: 149–220.
- Henderson, J. R. 1885. Diagnoses of new species of Galatheidæ collected during the “Challenger” expedition. *Annals and Magazine of Natural History (ser. 5)* 16: 407–421.
- Komai, T. 2000. A check list of Thalassinidea and Anomura (Crustacea: Decapoda) from the South China Sea. *Raffles Bulletin of Zoology, Supplement* 8: 343–376.
- Komai, T., and T.-Y. Chan. 2010. Two new pandalid shrimps and the discovery of the second specimen of the rare hippolytid shrimp *Leontocaris bulga* Taylor & Poore, 1998 (Crustacea, Decapoda) from the Mozambique MAINBAZA cruise. *Zoosystema*, 32(4): 625–641.
<http://dx.doi.org/10.5252/z2010n4a6>
- Laurie, R. D. 1926. Reports of the Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of Mr. J. Stanley Gardiner, M.A. Vol. 8, No. VI.—Anomura collected by Mr. J. Stanley Gardiner in the western Indian Ocean in H. M. S. *Sealark*. *Transactions of the Zoological Society of London (ser. 2, Zoology)* 19: 121–167, pls 8, 9.
- Lavaleye, M., G. Duineveld, T. Lundälv, M. White, D. Guihen, K. Kiriakoulakis, and G. A. Wolff. 2009. Cold-water corals on the Tisler Reef. *Oceanography* 22(1): 54–62.
<http://dx.doi.org/10.5670/oceanog.2009.08>
- Lin, C.-W., and T.-Y. Chan. 2011. Two new deep-sea squat lobsters of the genus *Munidopsis* Whiteaves, 1874 (Crustacea: Decapoda: Munidopsidae) from Taiwan. *Zootaxa* 2754: 51–59.
- Lovén, S. 1852. De svenska arterna af släktet *Galathea*. *Öfversigt af Konglige Vetenskaps-Akademiens Förhandlingar* 9: 20–23.
- Macpherson, E. 2007. Species of the genus *Munidopsis* Whiteaves, 1784 from the Indian and Pacific Oceans and reestablishment of the genus *Galacantha* A. Milne-Edwards, 1880 (Crustacea, Decapoda, Galatheidæ). *Zootaxa* 1417: 1–135.
- Macpherson, E., D. Amon, and P. F. Clark. 2014. A new species of *Munidopsis* from a seamount of the Southwest Indian Ocean Ridge (Decapoda: Munidopsidae). *Zootaxa* 3753: 291–296.
<http://dx.doi.org/10.11646/zootaxa.3753.3.8>
- Mayo, B. S. 1974. *The Systematics and Distribution of the Deep-sea Genus Munidopsis (Crustacea, Galatheidæ) in the Western Atlantic Ocean*. Ph.D thesis, University of Miami, 342 pp. (unpublished).
- Milne Edwards, A. 1880. Reports on the results of dredging under the supervision of Alexander Agassiz, in the Gulf of Mexico and in the Caribbean Sea, etc. VIII. Études préliminaires sur les Crustacés. *Bulletin of the Museum of Comparative Zoology at Harvard College* 8: 1–168, pls 1, 2.

- Milne Edwards, A. 1881. Compte rendu sommaire d'une exploration zoologique faite dans l'Atlantique, a bord du navire le Travailleur. *Comptes Rendus Hebdomadaires de Séances de l'Académie des Sciences, Paris* 93: 931–936.
- Ortmann, A. E. 1898. Crustacea, Malacostraca. In *Die Klassen und Ordnungen der Arthropoden wissenschaftlich dargestellt in Wort und Bild*, ed. A. Gerstäcker and A. E. Ortmann. *H. G. Bronn's Die Klassen und Ordnungen der Thier-Reichs wissenschaftlich dargestellt in Wort und Bild* 5(2): 1057–1168, pls 109–116. Leipzig: C.F. Winter'sche Verlagshandlung.
- Osawa, M., C.-W. Lin, and T.-Y. Chan. 2008. Species of Galacantha and Munidopsis (Crustacea: Decapoda: Anomura: Galatheidæ) from the deep-waters off Taiwan, with the description of two new species. *Scientia Marina* 72(1): 37–57.
- O'Shea, S., D. McKnight, & M. Clark. 1999. Bycatch—the common, unique, and bizarre. *Seafood New Zealand* 7(5): 45–51.
- Pequegnat, W. E., and L. H. Pequegnat. 1971. New species and new records of *Munidopsis* (Decapoda: Galatheidæ) from the Gulf of Mexico and Caribbean Sea (Supplement to Texas A & M University Oceanographic Studies. Volume 1). Gulf Publishing Co, Houston, 25 pp.
- Poore, G. C. B. 2004. *Marine Decapod Crustacea of Southern Australia. A Guide to Identification (With Chapter on Stomatopoda by Shane Ahyong)*. Melbourne: CSIRO Publishing, 574 pp.
- Poore, G. C. B., S. T. Ahyong, and J. Taylor. 2011. *The Biology of Squat Lobsters*. Melbourne: CSIRO Publishing, 363 pp.
- Poore, G. C. B., A. W. McCallum, and J. Taylor. 2008. Decapod Crustacea of the continental margin of southwestern and central Western Australia: preliminary identifications of 524 species from FRV *Southern Surveyor* voyage SS10-2005. *Museum Victoria Science Report* 11: 1–106.
- Rowden, A. A., K. E. Schnabel, T. A. Schlacher, E. Macpherson, S. T. Ahyong, and B. Richer de Forges. 2010. Squat lobster assemblages on seamounts differ from some, but not all, deep-sea habitats of comparable depth. *Marine Ecology* 31: 63–83. <http://dx.doi.org/10.1111/j.1439-0485.2010.00374.x>
- Tavares, M., G. A. S. Melo-Filho, and G. A. S. Melo. 2008. The deep-sea squat lobster *Munidopsis transtridens* Pequegnat and Pequegnat, 1971 (Decapoda: Anomura: Galatheidæ) from the Southwestern Atlantic. *Nauplius* 16: 95–99.
- Taylor, J., S. T. Ahyong, and N. Andreakis. 2010. New records and new species of the munidopsine squat lobsters (Decapoda: Anomura: Galatheidæ: Munidopsinae) from Australia. *Zootaxa* 2642: 1–18.
- Webber, W. R., G. D. Fenwick, J. M. Bradford-Grieve, S. H. Eager, J. S. Buckeridge, G. C. B. Poore, E. W. Dawson, L. Watling, J. B. Jones, J. B. J. Wells, N. L., Bruce, S. T. Ahyong, K. Larsen, M. A. Chapman, J. Olesen, J.-S. Ho, J. D. Green, R. J. Shiel, C. E. F. Rocha, A.-N. Lörz, G. J. Bird, and W. A. Charleston. 2010. Phylum Arthropoda. Subphylum Crustacea: shrimps, crabs, lobsters, barnacles, slaters, and kin. In *New Zealand Inventory of Biodiversity, Volume two. Kingdom Animalia: Chaetognatha, Ecdysozoa, Ichnofossils*, ed. D.P. Gordon, pp. 98–232. Christchurch: Canterbury University Press.
- Whiteaves, J. F. 1874. On recent deep-sea dredging operations in the Gulf of St. Lawrence. *American Journal of Science (ser. 3)* 7: 210–219.
- Yaldwyn, J. C., and W. R. Webber. 2011. Annotated checklist of New Zealand Decapoda (Arthropoda: Crustacea). *Tuhinga* 22: 171–272.

Manuscript submitted 21 January 2014, revised and accepted 11 March 2014.
Associate Editor Dr Elena Kupriyanova.

INSTRUCTIONS TO AUTHORS

Manuscripts must be submitted to the Editor. All manuscripts are refereed externally. Members of the Editorial Committee oversee the peer-review process and establish publication standards.

Only those manuscripts that meet the following requirements will be considered for publication.

Submit manuscripts and all images electronically; images should be high resolution TIFFs (see below). Attach one summary file or cover sheet giving: the title; the name, address and contact details of each author; the author responsible for checking proofs; a suggested running-head of less than 40 character-spaces; and the number of figures, tables and appendices. Manuscripts must be complete when submitted.

Tables and figures should be numbered and referred to in numerical order in the text. Electronic copy is stripped and reconstructed during production, so authors should avoid excessive layout or textual embellishments; a single font should be used throughout.

All copy is manipulated within a Windows (not Mac) environment using Microsoft and Adobe software. Maps should be submitted as high resolution TIFF.

Manuscripts should be prepared using recent issues as a guide. There should be a title (series titles should not be used), author(s) with their institutional addresses, an abstract (should be intelligible by itself, informative not indicative), introduction (should open with a few lines for general, non-specialist readers), materials and methods, results (usually subdivided with primary, secondary and rarely tertiary-level headings), discussion, acknowledgments and references. If appropriate, an appendix may be added after references.

In the titles of zoological works the higher classification of the group dealt with should be indicated. Except for common abbreviations, definitions should be given in the materials and methods section. Sentences should not begin with abbreviations or numerals; generic names should not be abbreviated if at the beginning of a sentence. Metric units must be used except when citing original specimen data. It is desirable to include geo-spatial coordinates; when reference is made to them, authors must ensure that their format precludes ambiguity, in particular, avoid formats that confuse arcminutes and arcseconds.

Label and specimen data should, as a minimum requirement, indicate where specimens are deposited, in addition to locality, date and collector. Original specimen data—especially that of type material—is preferred over interpreted data. If open to interpretation, cite original data between quotation marks or use “[sic]”.

Rules of the International Code of Zoological Nomenclature must be followed; authors must put a very strong case if a Recommendation is not followed. When new taxa are proposed in works having multiple authors, the identity of the author(s) responsible for the new name(s) and for satisfying the criteria of availability, should be made clear in accordance with Recommendations in Chapter XI of the Code. A scientific name with more than two authors is unwieldy and should be avoided. Keys are desirable; they must be dichotomous and not serially indented. Synonymies should be of the short form: taxon author, year, pages and figures. A period and en-dash must separate taxon and author except in the case of reference to the original description. Proposed type material should be explicitly designated and, unless institutional procedure prohibits it, registered by number in an institutional collection.

Previously published illustrations will generally not be accepted. Extra costs resulting from colour production are charged to the author. All images must (a) be rectangular or square and scalable to a width of 83 mm (one text column) or 172 mm (both text columns including gutter) and any depth up to 229 mm (the number of lines in a caption limits depth); (b) have lettering similar to 14 point, upper case, normal, Helvetica or Arial, in final print; (c) have no unnecessary white or black space; and (d) have vertical or horizontal scale bars, with the lengths given in the caption and with the thickness approximately equal to an upper case 14 point letter “I”.

Digital images must be presented as TIFF, or as multilayered PSD files suitable for *Adobe Photoshop* version 5.0 or later. Halftone and colour images must be at a minimum resolution of 300 dpi at final size (at this resolution 2040 pixels = printed-page width) and all labelling must be sharp (with *anti-aliased* active). Black and white line images (bitmaps) must be at a minimum resolution of 1200 dpi at final size (at this resolution, 8160 pixels = page width = 172 mm).

When reference is made to figures in the present work use Fig. or Figs, when in another work use fig. or figs; the same case-rule applies to the words *tables* and *plates*. Figures and tables should be numbered and referred to in numerical order in the text.

Authors should refer to recent issues of the *Records of the Australian Museum* to determine the correct format for listing references and to *The Chicago Manual of Style* to resolve other matters of style. Insert URLs in the Reference section if they are known—use *digital object identifiers* (doi) if available (see www.crossref.org/SimpleTextQuery/).

Certain anthropological manuscripts (both text and images) may deal with culturally sensitive material. Responsibility rests with authors to ensure that approvals from the appropriate person or persons have been obtained prior to submission of the manuscript.

Stratigraphic practice should follow the *International Stratigraphic Guide* (second edition) and *Field Geologist's Guide to Lithostratigraphic Nomenclature in Australia*.

The Editor and Publisher reserve the right to modify manuscripts to improve communication between author and reader. Essential corrections only may be made to final proofs. No corrections can be accepted less than four weeks prior to publication without cost to the author(s). All proofs should be returned as soon as possible.

No reprints will be available.

All authors, or the Corresponding Author on their behalf, must sign a *Licence to Publish* when a manuscript is submitted, and certify that the research described has adhered to the Australian Museum's *Guidelines for Research Practice*—or those of their home institution providing they cover the same issues, especially with respect to authorship and acknowledgment. While under consideration, a manuscript may not be submitted elsewhere.

More information and examples are freely available at our website: <http://australianmuseum.net.au/Scientific-Publications>

Editor, *Records of the Australian Museum*
Australian Museum
6 College Street
Sydney NSW 2010, Australia
editor@austmus.gov.au

nature culture **discover**

Australian Museum science is freely accessible online at
<http://australianmuseum.net.au/journalfinder>
ISSN 0067-1975 (print) · ISSN 2201-4349 (online)

